



iSR6250

Intelligent Storage Router

Installation Guide

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Preface

This manual describes and provides installation procedures for the QLogic iSR6250 Intelligent Storage Router (iSR6250), also referred to as the *iSR6250 router* or simply *router*.

Intended Audience

This guide is for users who are responsible for installing, managing, and servicing the iSR6250 router and the storage area network (SAN) equipment to which it is attached.

What's in this Guide

This guide contains the information needed to install and configure the iSR6250 router. This preface explains the typographic conventions used in this guide, lists related documents, and specifies the intended audience. This section also provides safety and communications statements, as well as technical support and contact information.

The remainder of the user's guide contains the following sections and appendices:

- [Introduction](#) – Illustrates and describes QLogic's iSR6250 intelligent Storage Router, including the components contained within the iSR6250 router chassis: router blades, and power and cooling modules (PCMs).
- [Planning](#) – Describes how to plan for the iSR6250 router by considering the devices it needs to support, FC and iSCSI port performance requirements, performance tuning, high availability (HA), network management, disaster and recovery, services, and system security.
- [Installation](#) – Provides site requirements and describes how to install and configure an iSR6250 router. It also provides firmware installation instructions.
- [Configuration](#) – Describes how to configure the iSR6250 router to support virtual port groups (VPGs) and LUN mapping.
- [Diagnostics and Troubleshooting](#) – Provides system diagnostic and troubleshooting tools available for the iSR6250 router.

- [Removal/Replacement](#) – Describes how to remove and replace the following field replaceable units (FRUs): SFP transceivers, iSR6250 chassis blades, and power and cooling modules (PCMs).
- [Technical Specifications](#) – Summarizes the technical aspects of the iSR6250 router: interface, expansion configurations, performance features, iSCSI initiator support, device management, mechanical components, high availability features, data migration, supported protocols, and environment/safety measurements.
- [Simple Network Management Protocol](#) – Provides reference material for the simple network management protocol (SNMP) protocol, which you can use to manage the iSR6250 router using a third-party SNMP management application.
- [Log Messages](#) – Provides reference material on messages logged to a file, which you can retrieve using either the command line interface (CLI) (see the *iSR6200 Router CLI Users Guide*) or the SANsurfer Router Manager (see the *iSR6200 Router Manager Users Guide*).
- [Glossary](#) – Provides definitions of terms and acronyms that appear in the iSR6250 router documentation.

Related Materials

- *iSR6250 Router Quick Start Guide*, part number SN0054545-00
- *iSR6200 Storage Router Rack Mounting Guide*, part number ISR653401-00
- *iSR6200 Router CLI Users Guide*, part number ISR654601-00
- *iSR6200 Router Manager Users Guide*, part number ISR654602-00
- *Internet Protocol, Version 6 (IPv6) Specification*, RFC2460
- *Neighbor Discovery for IP Version 6 (IPv6)*, RFC2461
- *IPv6 Stateless Address Autoconfiguration*, RFC2462
- *Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification*, RFC2463
- *Transmission of IPv6 Packets over Ethernet Networks*, RFC2464
- *iSCSI draft standard deaft-ietf-ips-iSCSI-20*
- *Internet engineering task force (IETF): iSCSI Requirements and Design Considerations, iSCSI Naming and Discovery, Internet Protocol Specification (IPv4)*, RFC793
- *Transmission Control Protocol (TCP) Specification, RFC1122, Requirements for Internet Hosts-Communication Layers*
- *TCP Extensions for High Performance*, RFC1323

- *TCP Congestion Control*, RFC2581
- *ANSI SCSI: SCSI-3 Architecture Model (SAM)*, X3T10/994D/Rev 18, *SCSI-3 Controller Command Set*, X3T10/Project 1047D/Rev 6c. *IEEE: 802.1Q Virtual LAN (VLAN)*, *802.1p Priority of Service*, *802.3x Flow Control*, *802.3ad Link Aggregation*
- *SCSI-3 Fibre Channel Protocol (SCSI-FCP)*, X3.269:1996
- *Fibre Channel Physical and Signaling Interface (FC-PH)*, X3.230:199
- *Fibre Channel 2nd Generation (FC-PH-2)*, X3.297:1997
- *Third Generation Fibre Channel Physical and Signaling Interface (FC-PH-3)*, X3.303:1998, *Fibre Channel-Arbitrated Loop (FC-AL-2)*, working draft, revision 6.4, August 28, 1998
- *Fibre Channel Fabric Loop Attachment Technical Report (FC-FLA)* NCITS/TR-20:1998, *Fibre Channel-Private Loop Direct Attach Technical Report (FC-PLDA)*
- *SCSI Fibre Channel Protocol-2 (FCP-2)* working draft, revision 3, October 1, 1999
- *ANSI Information Technology-SCSI 3 Architecture Model*, revision 18, November 27, 1995

Documentation Conventions

This guide uses the following documentation conventions:

- **NOTE:** provides additional information.
- **CAUTION!** indicates the presence of a hazard that has the potential of causing damage to data or equipment.
- **WARNING!!** indicates the presence of a hazard that has the potential of causing personal injury.
- Text in **blue** font indicates a hyperlink (jump) to a figure, table, or section in this guide, and links to Web sites are shown in **underlined blue**. For example:
 - ❑ **Table 9-2** lists problems related to the user interface and remote agent.
 - ❑ See **"Installation Checklist"** on page 3-6.
 - ❑ For more information, visit **www.qlogic.com**.
- Text in **bold** font indicates user interface elements such as a menu items, buttons, check boxes, or column headings. For example:
 - ❑ Click the **Start** button, point to **Programs**, point to **Accessories**, and then click **Command Prompt**.

- ☐ Under **Notification Options**, select the **Warning Alarms** check box.
- Text in `Courier` font indicates a file name, directory path, or command line text. For example:
 - ☐ To connect to a group of hosts listed in a host group file (`.hst`), type `SANsurfer -g path` and then press ENTER.
 - ☐ Enter the following command: `sh ./install.bin`
- Key names and key strokes are indicated with UPPERCASE:
 - ☐ Press CTRL+P.
 - ☐ Press the UP ARROW key.
- Text in *italics* indicates terms, emphasis, variables, or document titles. For example:
 - ☐ For a complete listing of license agreements, refer to the *QLogic Software End User License Agreement*.
 - ☐ What are *shortcut keys*?
 - ☐ QLA2xxx (where xxx is 440, 460, 462).
- Topic titles between quotation marks identify related topics either within this manual or in the online help, which is also referred to as *the help system* throughout this document.

Communications Statements

The following statements apply to this product. The statements for other products intended for use with this product appear in their accompanying manuals.

Federal Communications Commission (FCC) Class A Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause unacceptable interference, in which case the user will be required to correct the interference at their own expense.

Neither the provider nor the manufacturer is responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communications Class A Compliance Statement

This equipment does not exceed Class A limits for radio emissions for digital apparatus, set out in Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques par les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

CE Statement

The CE symbol on the equipment indicates that this system complies with the EMC (Electromagnetic Compatibility) directive of the European Community (89/336/EEC) and to the Low Voltage (Safety) Directive (73/23/EEC). Such marking indicates that this system meets or exceeds the following technical standards:

- EN60950-1, A11:2004 – “Safety of Information Technology Equipment, Including Electrical Business Equipment”.
- EN 55022:1998, A1:2000, A2:2003 – “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment”.
- EN 55024:1998, A1:2001, A2:2003 – “Electromagnetic compatibility - Generic immunity standard Part 1: Residential commercial, and light industry.”
 - EN 61000-4-2: 1995, A1:1998, A2: 2001 – “Electrostatic Discharge Immunity Test”

- EN 61000-4-3: 2002 – “Radiated, Radio-Frequency, Electromagnetic Field Immunity Test”
- EN 61000-4-4: 1995, A1:2001, A2:2001 – “Electrical Fast Transient/Burst Immunity Test”
- EN 61000-4-5: 1995, A1:2001 – “Surge Immunity Test”
- EN 61000-4-6: 1996, A1:2001 – “Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields”
- EN 61000-4-8: 1993, A1:2001 – “Power Frequency Magnetic Field Immunity Test”
- EN 61000-4-11 Second Edition: 2004 – “Voltage Dips, Short Interruptions And Voltage Variations Immunity Tests”
- EN 61000-3-2: 2000 – “Limits For Harmonic Current Emissions (Equipment Input Current Less Than/Equal To 16 A Per Phase)” Class A
- EN 61000-3-3: 1995, A1:2001 – “Limitation Of Voltage Fluctuations And Flicker In Low-Voltage Supply Systems For Equipment With Rated Current Less Than Or Equal To 16 A”

VCCI Class A Statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Laser Safety Information

This product may use Class 1 laser optical transceivers to communicate over the fiber optic conductors. The U.S. Department of Health and Human Services (DHHS) does not consider Class 1 lasers to be hazardous. The International Electrotechnical Commission (IEC) 825 Laser Safety Standard requires labeling in English, German, Finnish, and French stating that the product uses Class 1 lasers. Because it is impractical to label the transceivers, the following label is provided in this manual.



Electrostatic Discharge Sensitivity (ESDS) Precautions

The assemblies used in the switch chassis are ESD sensitive. Observe ESD handling procedures when handling any assembly used in the switch chassis.

Replaceable Parts

The the iSR6250 router supports the following field replaceable units (FRUs):

- iSR6250 chassis blades
- Power and cooling modules (PCMs)
- Small form-factor pluggable (SFP) optical transceivers

License Agreements

Refer to the *QLogic Software End User License Agreement* for a complete listing of all license agreements affecting this product.

Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic switch products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider.

Visit the QLogic support Web site listed in [Contact Information](#) for the latest firmware and software updates.

Availability

QLogic Technical Support for products under warranty is available during local standard working hours excluding QLogic Observed Holidays.

Training

QLogic offers certification training for the technical professional for QLogic HBAs, CNAs, and switches. From the main QLogic web page at www.qlogic.com, click the **Education and Resources** tab at the top, then click the **Education & Training** tab on the left. The QLogic Global Training Portal offers in-person training, online courses, and certification exams.

Technical Certification courses include installation, maintenance and troubleshooting QLogic SAN products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a Certified Professional. The training professionals at QLogic may be reached by e-mail at tech.training@qlogic.com.

Contact Information

Please feel free to contact your QLogic approved reseller or QLogic Technical Support at any phase of integration for assistance. QLogic Technical Support can be reached by the following methods:

Web	http://support.qlogic.com
Email	support@qlogic.com

The QLogic knowledge database contains troubleshooting information for the QLogic HBAs. Access the data base from the QLogic Support Web page, <http://support.qlogic.com>. Use the Support Center search engine to look for specific troubleshooting information.

1 Introduction

This section illustrates and describes QLogic's iSR6250 intelligent Storage Router, including the components contained within the iSR6250 router chassis: router blades and power and cooling modules (PCMs).

The iSR6250 router is designed to provide:

- Storage consolidation on FC arrays by providing iSCSI server connectivity for FC arrays.
- Solution for distance replication and backup by providing SAN over WAN connectivity.

The iSR6250 router provides the following features:

- Cost-effective connectivity
- Scalability, reliability, and inter-operability
- Ease of use
- Rack real estate
- Power and cooling module (PCM)
- High-availability (HA) configurations
- OEM multi-path software

The following sections describe the features and capabilities of the iSR6250 router:

- [“iSR6250 Router Chassis” on page 1-2](#)
- [“Power and Cooling Module \(PCM\)” on page 1-3](#)
- [“iSR6250 Router Blades” on page 1-5](#)

iSR6250 Router Chassis

The iSR6250 router chassis includes the following hardware components:

- Full-wide, 1U, rack mount
- 2 bays for hot-replaceable ISR blades
- 2 bays for hot-replaceable power and cooling modules (PCMs)
- 1 mid-plane with 2 x EEPROMs
- Dual 275 watt power supplies

The iSR6250 router chassis contains two router blades, along with a power cooling module (PCM) for each blade. [Figure 1-1](#) illustrates an iSR6250 chassis.



Figure 1-1 iSR6250 Router

[Figure 1-2](#) shows the front and back plates on an iSR6250 router chassis that contains two iSR6250 blades.

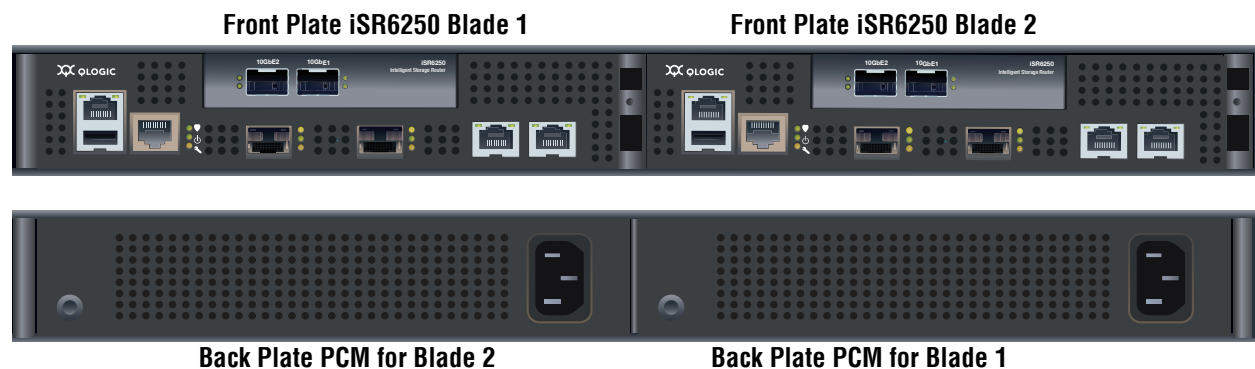


Figure 1-2 iSR6250 Router Chassis — Front and Back Plates

Power and Cooling Module (PCM)

Each iSR6250 chassis blade has a power and cooling module (PCM), located on the back-side of the chassis. Each PCM consists of one power supply, three fans, and one external status LED.

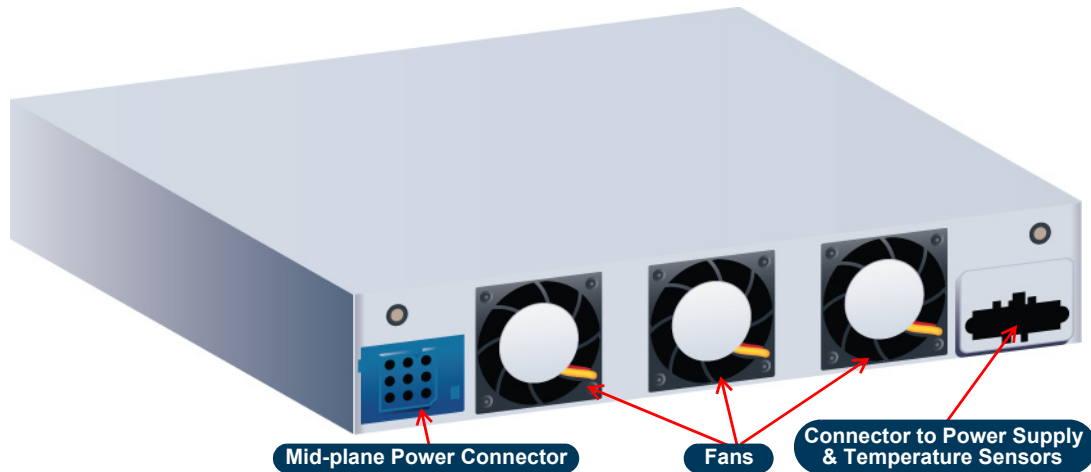


Figure 1-3 Power and Cooling Module (PCM)

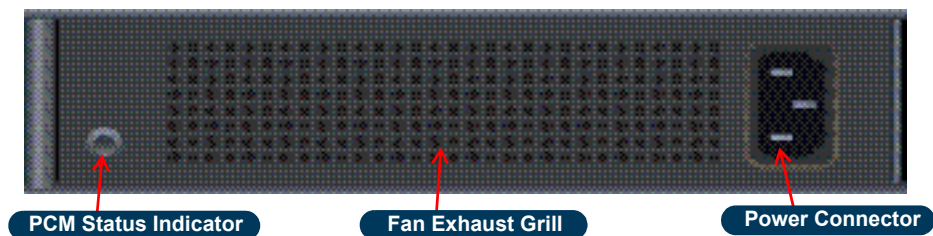


Figure 1-4 PCM — Back Plate

Each blade is capable of simultaneously driving all six fans in both PCMs. Normally, only one blade controls both fans, running them at a normal speed. However, if the system detects higher than expected temperature on either side of the blade, it forces the fans to run at full speed. Once the temperature is back to normal, the fans resume running at their normal speed.

Table 1-1 shows the internal temperature limits set to trigger events or alerts.

Table 1-1. Internal Temperature Sensor Limits

Sensor	High Fan Speed Temperature	Low Fan Speed Recovery Temperature	Critical Temperature (power off)	SMB_Alert Recovery Temperature
Front	60°C	55°C	70°C	55°C
Rear	45°C	40°C	55°C	45°C
CPU1	60°C	55°C	68°C	55°C
CPU2	60°C	55°C	68°C	55°C

The following paragraphs describe the fan speed and temperature parameters listed in Table 1-1.

- **High Fan Speed Temperature** – When a sensor detects a temperature that exceeds this value, the fan speed will run at their maximum RPM. The system logs the event and the system fault LED blinks five times every two seconds.
- **Low Fan Speed Recovery Temperature** – When the fans are running at their maximum RPM and all sensors report values less than this value, the fan speed resets to normal.
- **Critical Temperature** – When a sensor detects a temperature that exceeds this value, the system powers down the blade. When this happens, the CPUs enter sleep state 5; the system sets the PCI power state of capable devices to D3 and turns off the power supplies not essential to wake up the CPUs. When the temperature goes below the **Recovery Temperature** value, the sensor that reported the over temperature value will generate an SMB_ALERT.
- **Recovery Temperature** – Value at which a sensor will generate an SMB_ALERT to wake up the CPU and cause the blade to reboot.

iSR6250 Router Blades

Each chassis supports one or two blades. The blades are hot-pluggable. The base configuration of iSR6250 router blade has a dual core CPU, 1024 MB memory, boot flash, and internal and external I/O ports. (For detailed specifications, see [Appendix A](#).)

The following sections illustrate and describe the physical features and functionality of the iSR6250 router blades:

- “10GbE iSCSI Ports” on page 1-5
- “Router Blade LEDs” on page 1-6
- “Maintenance Button” on page 1-7
- “Fibre Channel Port LEDs” on page 1-9
- “Fibre Channel Transceivers” on page 1-11
- “Gigabit Ethernet Port LEDs” on page 1-11
- “Ethernet Port—Management” on page 1-12
- “Serial Port” on page 1-12

10GbE iSCSI Ports

The iSR6250 router blade has two 10Gb Ethernet ports, located in the expansion slot. Each port has the following capacity:

- 10GbE iSCSI ports that run in full duplex mode
- Support for jumbo frames
- IPv4 and IPv6 protocol support
- iSCSI header and data digest in the software



Figure 1-5 10Gb Ethernet Ports on the iSR6250 Router Blade

Router Blade LEDs

Each chassis blade provides LEDs and connectors that face the front of the chassis and may provide additional ports, depending on its model. The router blade LEDs shown in [Figure 1-6](#) provide information about the router's operational status. These LEDs include the heartbeat LED, the system fault LED, and the input power LED. The blade also includes a recessed beacon indicator used to locate the physical blade monitored using the SANsurfer Router Manager.

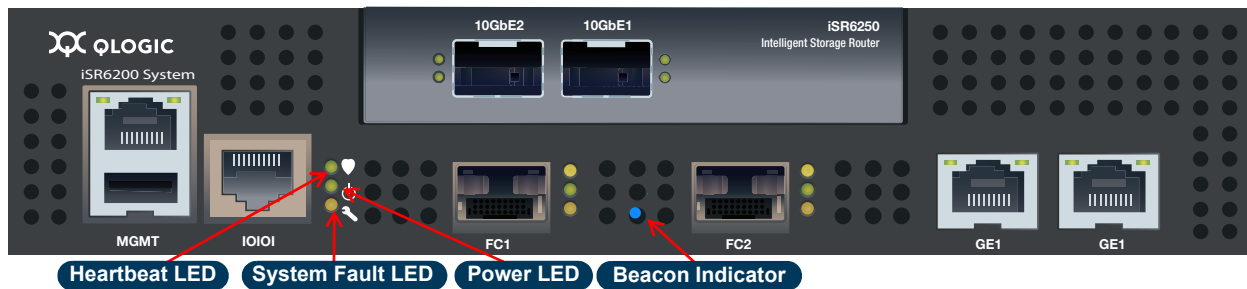


Figure 1-6 Router Blade LEDs

Heartbeat LED (Green)

The heartbeat LED blinks once a second as long the router firmware is operational.

System Fault LED (Amber)

The system fault LED lights up to show that a fault exists in the router firmware or hardware. Fault conditions include POST errors and over-temperature conditions. The LED shows a blink code for POST errors and the over temperature condition. See [Figure 1-6](#) and [Table 1-2](#).

Table 1-2. System Fault LED Blink Patterns

System Fault LED	Condition
OFF	OK (operational)
3 Blinks	System error
4 Blinks	Management port IP address conflict
5 Blinks	Over temperature
1 Blink	Beacon - synchronized with the heartbeat LED

Input Power LED (Green)

The power LED shows the voltage status of the router logic circuit board. During normal operation, this LED lights up to show that the router logic circuit board is receiving the DC voltage from the power supply.

Beacon Indicator (Blue)

The iSR6250 router blade's PCB has a blue beacon light installed near the center vent hole between the FC ports (Figure 1-6). This light enables you to locate the physical blade when monitoring the iSR6250 routers using the SANsurfer Router Manager. If you enable the **Beacon On** option for a selected blade in the Router Manager, the blue beacon light flashes through the vent hole on the chassis blade's face plate.

Maintenance Button

The maintenance button shown in Figure 1-7 is the only router blade control. Press this button to reset the router blade or to recover it if it becomes disabled.

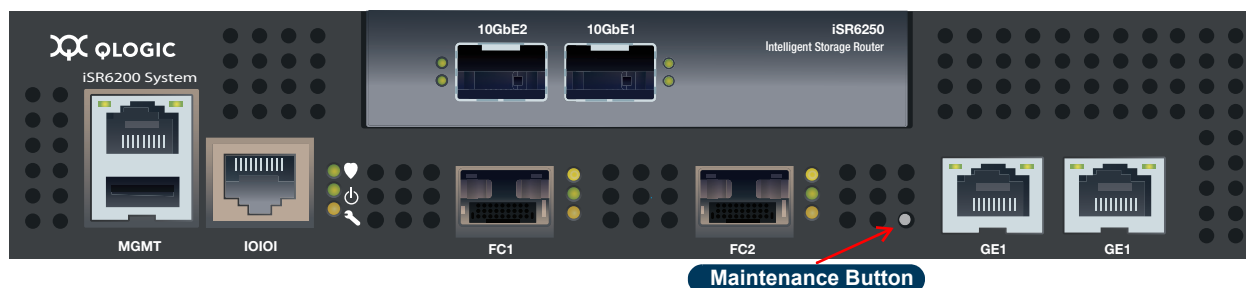


Figure 1-7 Maintenance Button

The maintenance button is a multifunction momentary switch on the front panel. It has the following functions:

- [Reset a Router Blade](#) (see [page 1-8](#))
- [Reset and Select Boot Image](#) (see [page 1-8](#))
- [Reset IP Address](#) (see [section page 1-8](#))
- [Enable DHCP](#) (see [section page 1-8](#))
- [Restore Factory Defaults](#) (see [page 1-9](#))

Reset a Router Blade

To reset the router blade, use a pointed, nonmetallic tool to momentarily press and release (less than two seconds) the maintenance button. The router responds as follows:

1. All the router blade LEDs illuminate.
2. After about 2 seconds, the POST begins, turning off the heartbeat and system fault LEDs.
3. When the POST is complete, the power LED is on and the heartbeat LED flashes once per second.

Reset and Select Boot Image

You can reset the router using either the primary or secondary boot image:

- **Primary Image** – To reset the router and select the primary boot image, use a pointed, nonmetallic tool to press and hold the maintenance button until the heartbeat LED flashes once, then release the button. The router will boot from the primary boot image. The boot time is less than one minute.
- **Secondary Image** – To reset the router and select the secondary boot image, use a pointed, nonmetallic tool to press and hold the maintenance button until the heartbeat LED flashes twice, then release the button. The heartbeat LED flashes twice. The router boots from secondary boot image. The boot time is less than one minute.

Reset IP Address

To reset the router and restore the maintenance port IP address to the default (10.0.0.1), use a pointed, nonmetallic tool to press and hold the maintenance button until the heartbeat LED flashes six times, then release the button. The router boots and sets the maintenance port to IP address 10.0.0.1. The boot time is less than one minute.

The IP address set by this method is not persistent; to make the change persistent, use the command line interface (CLI) or SANsurfer Router Manager to set the IP address. For more information, see the *iSR6200 Router Manager User's Guide* and the *iSR6200 Router CLI User's Guide*.

Enable DHCP

To reset the router and configure the maintenance port to use DHCP to acquire its IP address, use a pointed, nonmetallic tool to press and hold the maintenance button until the heartbeat LED flashes seven times, then release the button. The router boots and configures the maintenance port for DHCP. The boot time is less than one minute.

Enabling DHCP by this method is not persistent; to make the change persistent, use the command line interface (CLI) or SANsurfer Router Manager to enable DHCP. For details, see the *iSR6200 Router Manager User's Guide* and the *iSR6200 Router CLI User's Guide*.

Restore Factory Defaults

To reset the router and restore it to the factory default configuration, use a pointed, nonmetallic tool to press the maintenance button and hold it until the heartbeat LED flashes 20 times, then release the button. The router boots and is restored to the factory defaults. The boot time is less than one minute.

The router does the following when restored to the factory defaults:

- Clears all router log entries.
- Resets all passwords.
- Resets the maintenance port IP address to 10.0.0.1.
- Disables the iSCSI ports and sets the IP address to 0.0.0.0.
- Erases all presentations.
- Erases all discovered initiators and targets.

Fibre Channel Port LEDs

The iSR6250 router has two Fibre Channel ports. The ports are labeled *FC1* and *FC2*, as shown in [Figure 1-8](#).

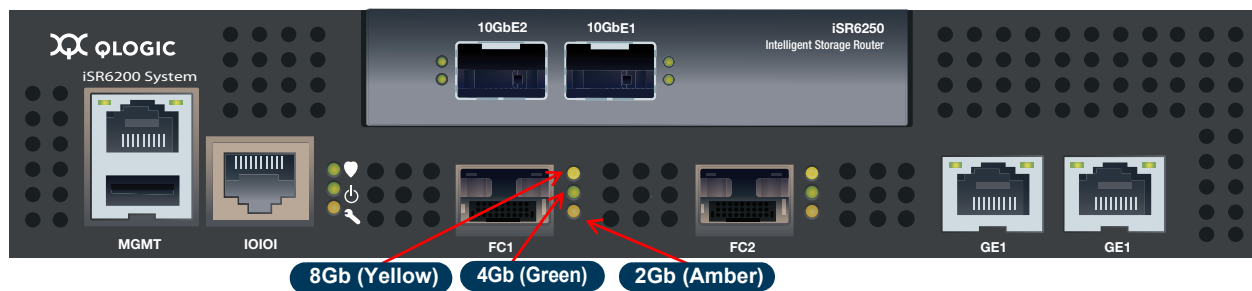


Figure 1-8 Fibre Channel LEDs

The port LEDs are located to the right of their respective ports and provide status and activity information.

Each port has three LEDs:

- The yellow LED (top) shows activity for data passing through the port at 8-Gbps speed.
- The green LED (middle) shows activity for data passing through the port at 4-Gbps speed.
- The amber (bottom) LED shows activity for data passing through the port at 2-Gbps speed.

Table 1-3 describes the LED blink patterns and their meanings.

Table 1-3. Port LEDs

Activity	Yellow LED (8 Gbps)	Green LED (4 Gbps)	Amber LED (2 Gbps)
Power OFF	OFF	OFF	OFF
Power ON (before firmware initialization)	ON	ON	ON
Power ON (after firmware initialization)	Flashing	Flashing	Flashing
Firmware initial- ization error ^a	Alternate Flashing..	Alternate Flashing..	Alternate Flashing..
Online, 2-Gbps link - I/O activity	OFF	OFF	ON/Flashing
Online, 4-Gbps link - I/O activity	OFF	ON/Flashing	OFF
Online, 8-Gbps link - I/O activity	ON/Flashing	OFF	OFF
Beacon	Flashing	OFF	Flashing

^a Yellow, green, and amber LEDs flash alternatively to indicate firmware initialization errors.

Fibre Channel Transceivers

Each port is served by a small form-factor pluggable (SFP) optical transceiver and is capable of 1-, 2-, 4-, or 8-Gbps transmission. SFPs are hot-pluggable. User ports can self-discover both the port type and transmission speed when connected to public devices or switches.

The iSR6250 router supports SFP optical transceivers for the Fibre Channel ports. A transceiver converts electrical signals to and from optical laser signals to transmit and receive data. Duplex fiber optic cables plug into the transceivers, which then connect to the devices. For example, a 1-Gbps/2-Gbps Fibre Channel port can transmit at 1-Gbps or 2-Gbps; however, the transceiver must also be capable of delivering these rates.

The SFP transceivers are hot pluggable. You can remove or install a transceiver while the router is operating without harming the router or the transceiver. However, this interrupts communication with the connected device. See [page 3-7](#) for information about installing and removing SFP optical transceivers.

Gigabit Ethernet Port LEDs

The Gigabit Ethernet ports shown in [Figure 1-9](#) are RJ-45 connectors that provide connection to an Ethernet SAN through a 100/1000 Base-T Ethernet cable. The ports are labeled *GE1* and *GE2*. Each of these ports supports connections that run the iSCSI high-level TCP protocol.

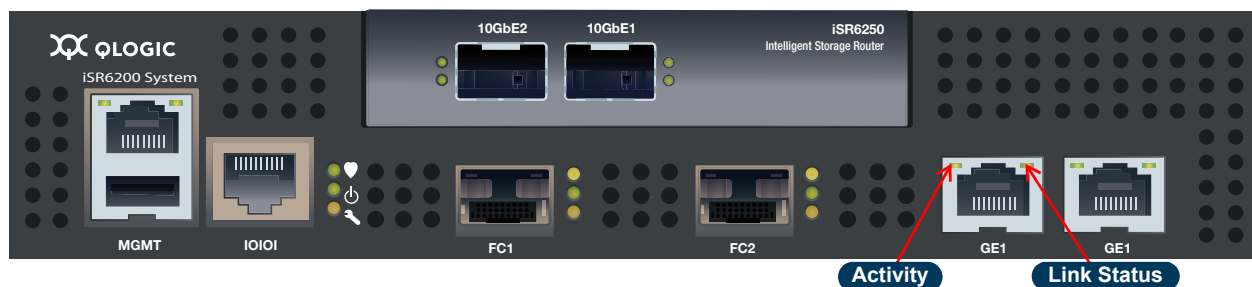


Figure 1-9 Gigabit Ethernet Ports

These ports each have two LEDs:

- The activity LED (green) lights up when the port transmits or receives data over the Ethernet connection.
- The link status LED (green) lights up continuously when the port establishes an Ethernet connection.

Ethernet Port—Management

The management Ethernet port shown in [Figure 1-10](#) is an RJ-45 connector that provides a connection to a management workstation through a 10/100 Base-T Ethernet cable. The port is labeled *MGMT*.



Figure 1-10 Ethernet Management Port

A management workstation can be a Windows®, Solaris™, or a Linux™ workstation that configures and manages the router. You can manage the router over an Ethernet connection using the SANsurfer Router Manager, command line interface (CLI), or simple network management protocol (SNMP).

The management Ethernet port has two LEDs:

- The link status LED (green) lights up continuously when the port establishes an Ethernet connection.
- The activity LED (green) lights up when the port transmits or receives data over the Ethernet connection.

Serial Port

The iSR6250 router is equipped with an RS-232 serial port for maintenance purposes. [Figure 1-11](#) shows the serial port location, which is labeled *IO/IO*. You can manage the router through the serial port using CLI.

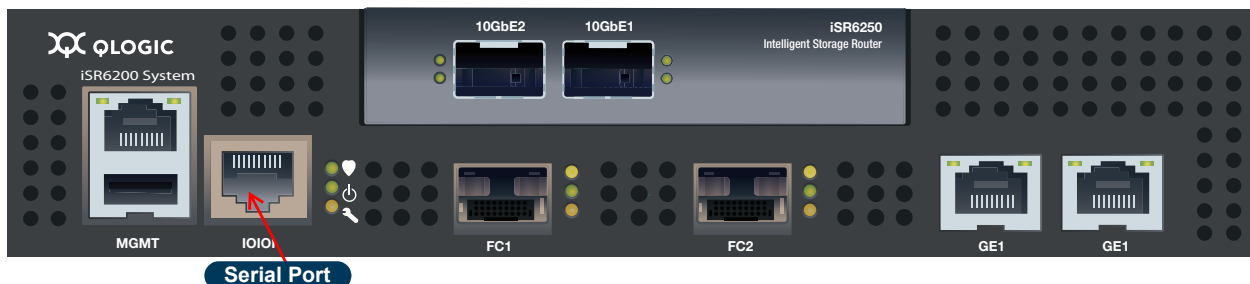


Figure 1-11 Serial Port

The serial port connection requires a standard eight-wire Ethernet cable and the supplied dongle to convert the Ethernet RJ45 connector to a female DB9 connector. [Table 1-4](#) defines the serial port pins for both the router's RJ45 connector and the dongle DB9 connector.

Table 1-4. Serial Port Pin Identification

Dongle DB9 Pin Number	Router RJ45 Pin Number	Description
1	5	Data carrier detect (DCD)
2	6	Receive data (RxD)
3	3	Transmit data (TxD)
4	2 & 7	Data terminal ready (DTR)
5	4	Signal ground (GND)
6	5	Data set ready (DSR)
7	1	Request to send (RTS)
8	8	Clear to send (CTS)
9	NC	Ring indicator (RI)

Notes

2

Planning

This section describes how to plan for the iSR6250 router. The following sections describe the devices and services you need to consider when planning to use the iSR6250 router:

- [“Devices” on page 2-1](#)
- [“Device Access” on page 2-2](#)
- [“FC Switches Required for VPGroups” on page 2-2](#)
- [“FC Performance” on page 2-2](#)
- [“iSCSI Performance” on page 2-3](#)
- [“Performance Tuning” on page 2-4](#)
- [“High Availability” on page 2-7](#)
- [“Management” on page 2-7](#)
- [“Recovery” on page 2-7](#)
- [“Services” on page 2-8](#)
- [“Security” on page 2-8](#)

Devices

When planning to use the router, consider the number of devices and the anticipated demand. This determines the number of ports required and in turn the number of routers.

The router uses SFP transceivers in the 8-Gbps Fibre Channel (FC) ports, but some FC devices may not use the same transceivers. Consider whether the FC device you want to connect the router to uses SFP or gigabit interface converters (GBIC) transceivers, and choose fibre optic cables accordingly. Use LC-type cable connectors for SFP transceivers and SC-type cable connectors for GBIC transceivers. Also consider the transmission speed compatibility of your devices, host bus adapters (HBAs), switches, and SFPs.

Device Access

Consider device access needs within the FC and iSCSI SANs. Controlling access to FC device LUNs requires mapping FC device LUNs to specific iSCSI initiators. You may map LUNs to more than one initiator. Giving multiple initiators access to a LUN requires access management.

Fibre Channel

The Fibre Channel ports automatically discover all FC target devices, whether connected directly (loop) or by fabric (switch).

iSCSI

The iSCSI ports automatically present targets discovered on the Fibre Channel ports. If the FC target's LUN 0 is a controller LUN, it becomes accessible (mapped) to all iSCSI initiators. All data LUNs are inaccessible until mapped. The exception to this is if LUN 0 is a controller LUN, then it is mapped automatically to allow for management of the FC target controller.

When an iSCSI initiator logs on, the router records the initiator's iSCSI name and IP address. The management interface [command line interface (CLI) and SANsurfer Router Manager] uses the initiator information to simplify the mapping process.

FC Switches Required for VPGroups

iSR6250 uses QLogic HBA technology and is compatible with all Fibre Channel switches from Brocade, Cisco, McData, and QLogic. If you want to use more than one VPGroup, you must use Fibre Channel Switches.

FC Performance

The iSR6250 router supports Fibre Channel service at transmission rates of 2, 4, or 8 Gbps with a maximum frame size of 2148 bytes. Related performance characteristics include the following:

- [Distance](#) (see [page 2-3](#))
- [Bandwidth](#) (see [page 2-3](#))
- [Latency](#) (see [page 2-3](#))

Distance

Consider the physical distance between Fibre Channel devices. Choose SFP transceivers that are compatible with the cable type and distance.

Each Fibre Channel port is supported by a data buffer with a three-credit capacity; that is, three maximum sized frames. For fibre optic cables, this enables full bandwidth over the following approximate distances:

- 5 kilometers at 1 Gbps (0.6 credits/Km)
- 2.5 kilometers at 2 Gbps (1.2 credits/Km)

Beyond these distances, however, the connection loses some efficiency because the transmitting port must wait for an acknowledgement before sending the next frame.

Bandwidth

Bandwidth is a measure of the volume of data that can be transmitted at a given transmission rate. A 1-Gbps/2-Gbps FC port can transmit or receive at nominal rates of 1- or 2-Gbps, depending on the device to which it is connected. This corresponds to actual bandwidth values of 106 MB and 212 MB, respectively.

Latency

Latency is a measure of how fast a transaction travels through the router.

iSCSI Performance

The iSR6250 router supports Ethernet service at transmission rates of 1000-, 100- or 10-Mbps with an MTU size of 1500 or 9000 (jumbo frames).

NOTE:

An MTU size greater than 1500 should only be used when the router is connected to a 1000 Mbps Ethernet network.

Related performance characteristics include the following:

- [Distance](#)
- [Bandwidth](#)
- [Latency](#)

Distance

Consider the physical distance between routers. This is usually measured in round-trip delay. Round-trip delays range anywhere from less than 1 millisecond to as great as 250 milliseconds.

Bandwidth

Bandwidth is a measure of the volume of data that can be transmitted at a given transmission rate. WAN data rates range from 1.5 megabits per second (T1) to greater than 600 megabits per second (OC-12).

Latency

Latency is a measure of how fast a transaction travels through the router and LAN/WAN.

Performance Tuning

Proper configuration maximizes the router's performance. Knowing the round trip delay (distance between the router and iSCSI initiators) and WAN effective data rate (connection type) allows you to tune the router for optimal performance. The following tables provide **TCP Window Size** settings for specific WAN environments. The **TCP Window Size** is configured as two parameters: **Window Size** and **Scaling Factor**. See the *iSR6200 Router Manager User's Guide* and the *iSR6200 Router CLI User's Guide* for configuring the TCP window size.

Table 2-1. T1: 1.554 Mb/Sec

Round Trip Delay (ms)	TCP Window Size (kBytes)
<= 41.5	8
<= 82.9	16
<= 165.8	32
<= 331.6	64
<= 663.2	128
<= 1326.5	256
<= 2652.9	512

Table 2-2. T3: 45Mbps/Sec

Round Trip Delay (ms)	TCP Window Size (kbytes)
<= 1.4	8
<= 2.9	16
<= 5.7	32
<= 11.4	64
<= 22.9	128
<= 45.8	256
<= 91.6	512
<= 183.1	1024
<= 366.2	2048*
<= 732.5	4096*

*Supported in FCIP mode only.

Table 2-3. OC1: 51 Mbps/Sec

Round Trip Delay (ms)	TCP Window Size (kbytes)
<= 1.2	8
<= 2.5	16
<= 4.9	32
<= 9.9	64
<= 19.8	128
<= 39.5	256
<= 79.0	512
<= 158.0	1024
<= 316.1	2048*
<= 632.1	4096*

*Supported in FCIP mode only.

Table 2-4. OC3: 156 Mbts/Sec

Round Trip Delay (ms)	TCP Window Size (bytes)
<= 0.4	8
<= 0.8	16
<= 1.6	32
<= 3.3	64
<= 6.6	128
<= 13.2	256
<= 26.3	512
<= 52.7	1024
<= 105.4	2048
<= 210.7	4096

Table 2-5. OC12: 621 Mbts/Sec

Round Trip Delay (ms)	TCP Window Size (bytes)
<= 0.1	8
<= 0.2	16
<= 0.4	32
<= 0.8	64
<= 1.6	128
<= 3.3	256
<= 6.6	512
<= 13.2	1024
<= 26.3	2048
<= 52.7	4096

High Availability

A dual-blade iSR6250 router supports high availability, which provides link-level, switch-level, and blade-level failure protection. To make this effective, you must connect the iSCSI hosts to both iSR6250 blades. For details, see [“Connecting iSCSI Hosts to your iSR6250” on page 4-13](#).

Management

The SANsurfer Router Manager application and CLI run on a management workstation used to configure, control, and maintain the router. Support platforms include Windows, Solaris, and Linux. The SANsurfer Router Manager application is installed and executed on the workstation.

The router supports the following management interfaces:

- **SANsurfer Router Manager** – Graphical user interface (GUI) application, which runs on a management workstation (see the *iSR6200 Router Manager User's Guide*).
- **CLI** – Command line interface, which runs on the router; users can access the CLI via telnet or the serial port (see the *iSR6200 Router CLI User's Guide*).
- **SNMP** – Provides router status, traps, and alerts (see [Appendix B](#)).

Recovery

You should have a process in place to recover from a possible router failure. Consider the following when developing a recovery process for the router:

- Save all firmware image files (updates) in a safe, well-known place, because you may:
 - Want to revert to a previous firmware version.
 - Need the firmware image when adding a router to your site.
- Save the router's configuration (as a new file) after every configuration change, because you may want to revert to a previous configuration.
- Save the router's LUN mappings (as a new file) after every mapping change, because you may:
 - Want to revert to a previous LUN mapping.
 - Want to duplicate the LUN mapping on a second router (for redundancy).

NOTE:

For more details on recovering a router blade, see [“iSR6250 Chassis Blades” on page 6-2](#).

Services

You can configure your router to suit the demands of your environment using a variety of router services. Familiarize yourself with the following router services and determine which ones you need:

- **Telnet** – Enables you to manage the router over a telnet connection.
- **Router management** – Provides for out-of-band management of the router with the SANsurfer Router Manager.
- **Simple network management protocol (SNMP)** – Enables you to monitor the router using third-party applications that use SNMP.
- **Network time protocol (NTP)** – Enables you to synchronize the router and the workstation dates and times with an NTP server. NTP is disabled (not configured) by default.
- **File transfer protocol (FTP)** – Enables you to transfer files rapidly between the workstation and router using FTP.
- **Secure SHell (SSH)** – Provides secure and encrypted connections to traditionally non-encrypted services.

Security

Passwords provide router security. The SANsurfer Router Manager requires a password each time a user logs into the application. Once connected, the SANsurfer Router Manager prompts for an administrative password before it accepts configuration changes.

The CLI also requires the user to enter a user ID and password to start. CLI must be in an admin session to perform any set operations. An admin session requires a password.

The default password for both these management tools is *password* for the default user ID of *guest*. The default administrative password is *config*.

Once logged on, you can change the password using the application's security features.

3 Installation

This section describes how to install and configure an iSR6250 router. It also provides firmware installation instructions. For details, see the following topics:

- [“Site Requirements” on page 3-1](#)
- [“Installing the iSR6250 Router” on page 3-2](#)
- [“Firmware Installation” on page 3-14](#)

Site Requirements

The following sections describe the requirements for installing a iSR6250 router:

- [Management Workstation](#) (see [page 3-1](#))
- [Power Requirements](#) (see [page 3-2](#))
- [Environmental Conditions](#) (see [page 3-2](#))

Management Workstation

The management workstation running the SANsurfer Router Manager must meet the requirements listed in [Table 3-1](#).

Table 3-1. Management Workstation Requirements

Item	Description
Operating system	One of the following: ■ Windows® 2000/2003 ■ Solaris 8/9/10 ■ Linux® Red Hat EL 3.x ■ SuSE® Linux 9.0 Enterprise ■ Mac OS® X 10.3
Memory	256 MB or more
Disk space	150 MB per installation
Processor	500 MHz or faster
Hardware	CD-ROM drive, RJ-45 Ethernet port, RS-232 serial port (optional)

Table 3-1. Management Workstation Requirements (Continued)

Item	Description
Internet browser	One of the following: ■ Microsoft Internet Explorer 5.0 and later ■ Netscape Navigator® 4.72 and later ■ Mozilla® Firefox 1.02 and later ■ Java 2 runtime environment to support the web applet

Power Requirements

Power requirements for the iSR6250 router are 0.5 Amp at 100 VAC or 0.25 A at 240 VAC.

Environmental Conditions

Consider the factors that affect the climate in your facility, such as equipment heat dissipation and ventilation. The router requires the following operating conditions:

- Operating temperature range: 5–40°C (41–104°F).
- Relative humidity: 15–80 percent, non-condensing.

Installing the iSR6250 Router

Unpack the router, accessories, and documentation. The iSR6250 router is shipped with the following components, shown in [Figure 3-1](#).

- iSR6250 router chassis with two blades installed
- DB9 to RJ45 cable adapter
- Power cable (6 foot black)
- Rail Mounting Kit, part number 50990-00
- *WEEE Conformance Card*
- *Readme Notice Card*
- *China Optics and Cable SKUs Toxic Substance Table*

To install the iSR6250 router:

1. Complete the pre-installation checklist (see [page 3-3](#)).
2. Mount the router (see [page 3-5](#)).
3. Install the transceivers (see [page 3-7](#)).
4. Connect the router to AC power (see [page 3-8](#)).

5. Connect the management workstation to the router (see [page 3-9](#)).
6. Configure the management workstation (see [page 3-10](#)).
7. Install the management application (see [page 3-12](#)).
8. Start the management application (see [page 3-13](#)).
9. Configure the router (see [page 3-13](#)).
10. Cable devices to the router (FC and iSCSI) (see [page 3-14](#)).

Pre-installation Check List

During the initial configuration process, the system prompts you to enter information for each blade contained in the iSR6250 chassis. Use the space provided in the following tables to record the IP addresses for each blade.

Table 3-2. Worksheet for Router Blade 1 (left) Parameters

Symbolic Name of the iSR6250 Blade 1	
Management port IP address, subnet mask, and gateway (if not using DHCP)	
iSCSI port 1 IP address, subnet mask, and gateway (GE-1)	
IP address of the iSNS server for iSCSI port 1 (if iSNS will be enabled)	
iSCSI port 2 IP address, subnet mask, and gateway (GE-2)	
IP address of the iSNS server for iSCSI port 2 (if iSNS will be enabled)	
iSCSI port 3 IP address, subnet mask, and gateway for the 10GE-3 port	
IP address of the iSNS server for iSCSI port 3 (if iSNS will be enabled)	

Table 3-2. Worksheet for Router Blade 1 (left) Parameters (Continued)

iSCSI port 4 IP address, subnet mask, and gateway for the 10GE-4 port	
IP address of the iSNS server for iSCSI port 4 (if iSNS will be enabled)	

Table 3-3. Worksheet for Router Blade 2 (right) Parameters

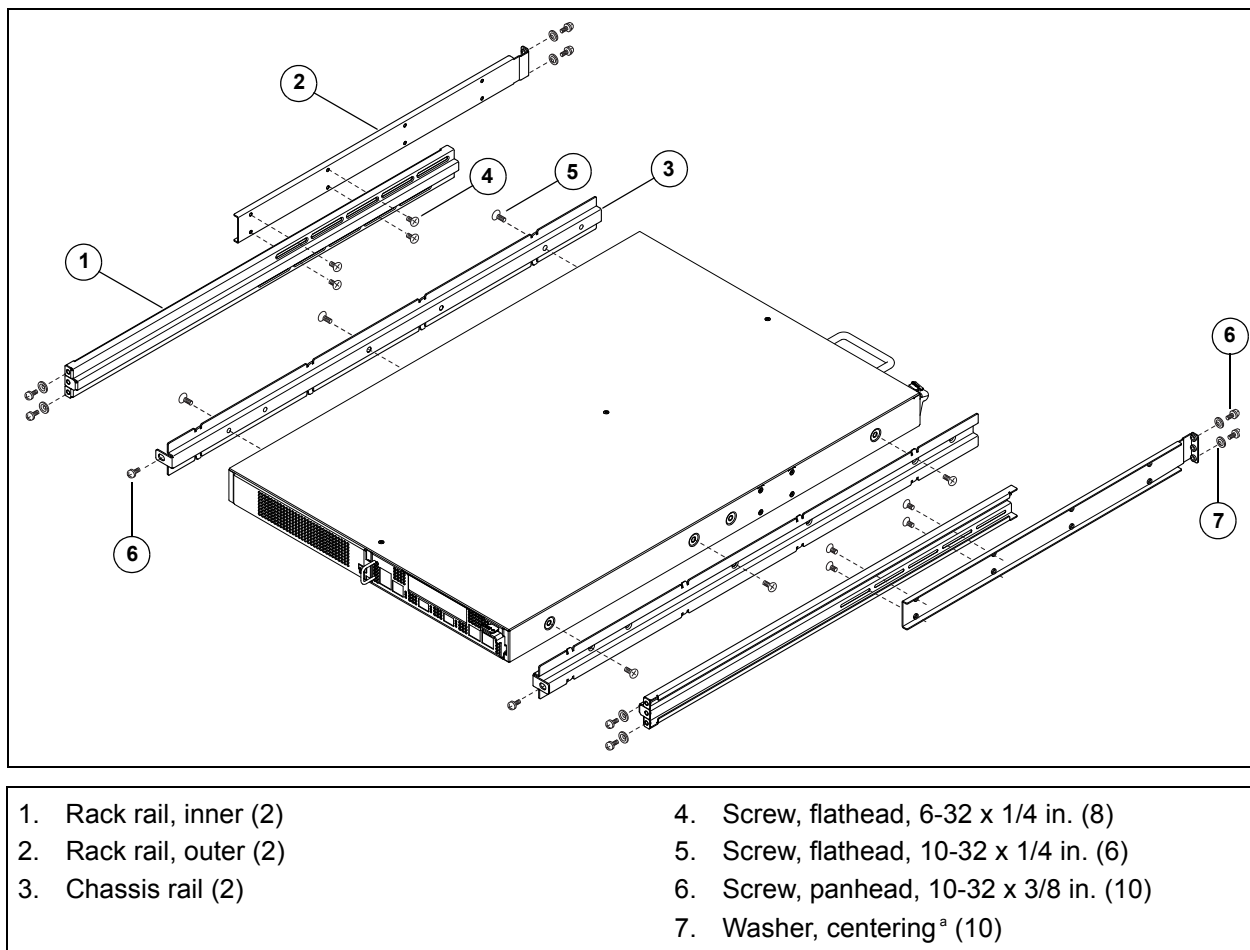
Symbolic Name of the iSR6250 Blade 2	
Management port IP address, subnet mask, and gateway (if not using DHCP)	
iSCSI port 1 IP address, subnet mask, and gateway (GE-1)	
IP address of the iSNS server for iSCSI port 1 (if iSNS will be enabled)	
iSCSI port 2 IP address, subnet mask, and gateway (GE-2)	
IP address of the iSNS server for iSCSI port 2 (if iSNS will be enabled)	
iSCSI port 3 IP address, subnet mask, and gateway for the 10GE-3 port	
IP address of the iSNS server for iSCSI port 3 (if iSNS will be enabled)	
iSCSI port 4 IP address, subnet mask, and gateway for the 10GE-4 port	
IP address of the iSNS server for iSCSI port 4 (if iSNS will be enabled)	

Mount the Router

You can either place the router on a flat surface or mount it in a 19-inch Electronic Industries Association (EIA) rack. See the product specification for weight and dimensions. Rack mounting requires a QLogic rack mounting kit; contact QLogic for more information.

If you mount the router in a closed or multi-unit rack assembly, make sure the operating temperature inside the rack enclosure does not exceed the maximum rated ambient temperature.

Figure 3-1 shows the iSR6200 Router Rail Kit components.



^a For use only with racks with square holes.

Figure 3-1 Rail Kit Components

Tools Required

- Cross-head screwdriver, medium

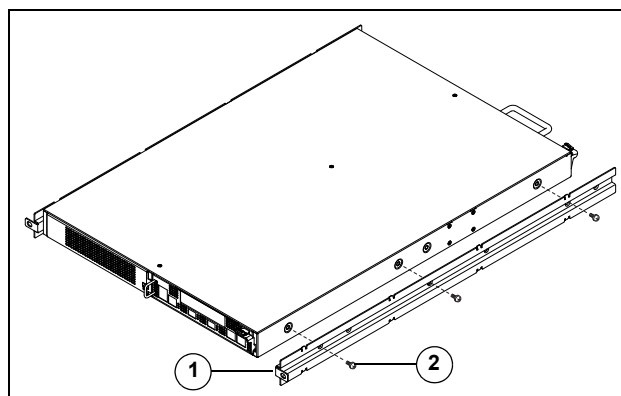
WARNING!!

- Heavier products should be placed near the bottom of a rack or cabinet. A top-heavy rack can become unstable resulting in equipment damage or personal injury.
- To avoid dropping the router, possibly causing personal injury or damage to the router, hold the router and rail assembly firmly when sliding it out of the rack.

Install Chassis Rails

Install the chassis rails on the chassis using three 10-32x1/4 screws to secure each rail.

The rail and the router have multiple mounting holes to permit the desired setback.

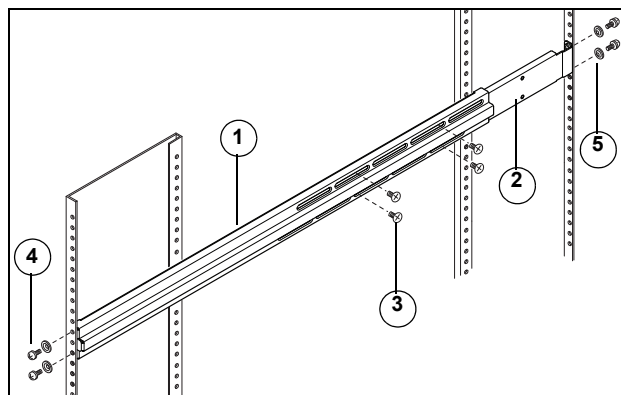


1. Chassis rail 2. Screws, 10-32x1/4

Assemble and Install Rack Rails

Assemble the inner and outer rack rails and secure them loosely with four 6-32 screws. Extend each rack rail assembly to fit the inner dimensions of the rack.

Fasten the rail assembly to the rack at both ends with two 10-32x3/8 screws using the upper and lower holes. If the rack holes are square, use a centering washer with each screw.

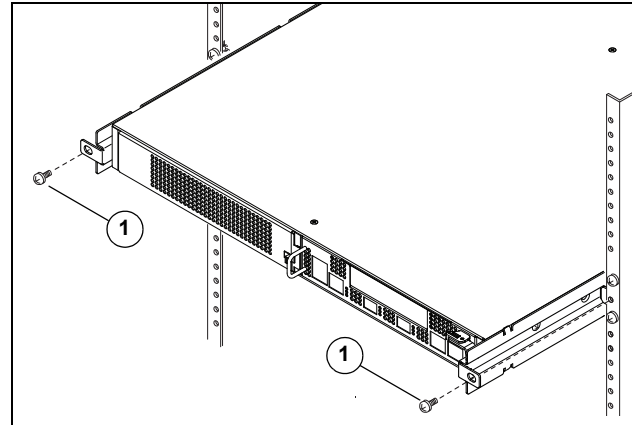


1. Inner rack rail 4. Screw, 10-32x3/8
2. Outer rack rail 5. Washer
3. Screw, 6-32

Install the Chassis

Slide the chassis and rail assembly into the rack rails.

Fasten the chassis to the rack with two 10-32 x 3/8 screws: one through each chassis rail flange.



1. Screws, 10-32x3/8

Install the Transceivers

The router supports a variety of SFP transceivers.

- To install a transceiver, insert the transceiver into the port and gently press until it snaps in place.
- To remove a transceiver, gently press the transceiver into the port to release tension, then pull the release tab or lever and remove the transceiver. Different transceiver manufacturers have different release mechanisms. Consult the documentation for your transceiver.

NOTE:

The transceiver fits only one way. If the transceiver does not install under gentle pressure, flip it over and try again.

Connect the Router to AC Power

WARNING!!

This product is supplied with a 3-wire power cable and plug for the user's safety. Use this power cable in conjunction with a properly grounded outlet to avoid electrical shock. An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the router chassis. The customer must make sure the outlet is correctly wired and grounded to prevent electrical shock.

You may require a different power cable in some countries because the plug on the cable supplied with the equipment will not fit your electrical outlet. In this case, you must supply your own power cable. The cable must meet the following requirements:

- For 125 Volt electrical service: the cable must be rated at 10 Amps and be approved by UL and CSA.
- For 250 Volt electrical service: the cable must be rated at 10 Amps, meet requirements of H05VV-F, and be approved by VDE, SEMKO, and DEMKO.

Figure 3-1 shows the front and back plates of an iSR6250 router chassis that contains two router blades with add-in ports installed for its model. Each power cooling module (PCM) provides a power connector, as well as a Status LED.

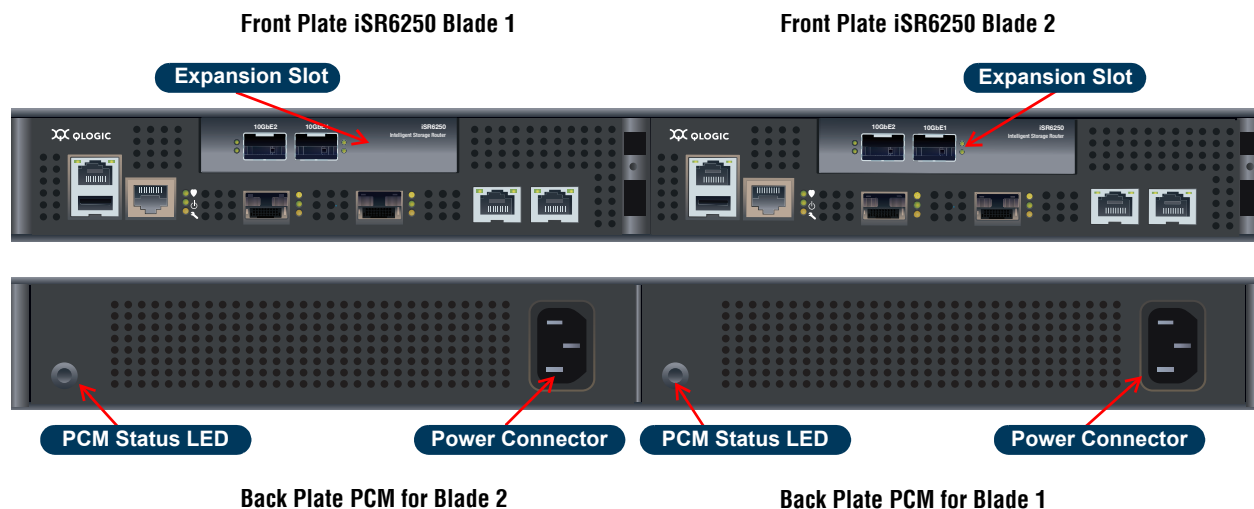


Figure 3-1 iSR6250 Router Chassis — Front and Back Plates

Use Figure 3-1 to locate the power connector and PCM status LED for the blade you're configuring.

To power on the router:

1. Attach the AC power cord to the power connector, located on the back side of the PCM connected directly behind the router blade.
2. Connect the opposite end of the power cord to a grounded AC wall outlet or power strip.
3. Check the PCM power LED to make sure the fan is operational (green = OK, yellow = no AC power).

Figure 3-2 shows the location of the ports and LEDs on one of the blades contained within the iSR6250 unit that are referenced in the following instructions.

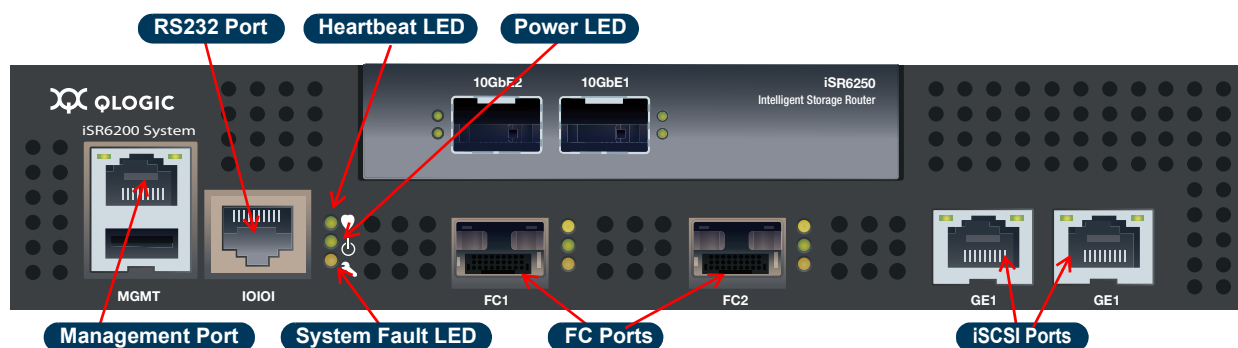


Figure 3-2 iSR6250 Blade Ports and LEDs

4. Verify that the router's input power LED is illuminated. The iSR6250 router runs its self test and begins normal operation—this may take a minute.
5. Verify that the heartbeat LED is blinking (once per second) and that the system fault LED is not illuminated.

If an error has occurred, the system fault LED will blink a pattern that indicates the fault reason. For more information about error blink patterns, see [page 5-3](#).

Connect the Management Workstation to the Router

You can manage the router using the SANsurfer Router Manager or the command line interface (CLI). SANsurfer Router Manager requires an Ethernet connection to the router. CLI can use an Ethernet connection or a serial connection. Choose the router management method, then connect the management workstation to the router in one of the following ways:

- Indirect Ethernet connection from the management workstation to the router RJ-45 connector through an Ethernet switch or hub. This requires a 10/100 Base-T straight cable.

- Direct Ethernet connection from the management workstation to the router RJ-45 Ethernet connector. This requires a 10/100 Base-T crossover cable.
- Serial port connection from the management workstation to the router RS-232 serial port connector. This requires a 10/100 Base-T straight cable and a dongle.

Configure the Management Workstation

The router comes from the factory with a default IP address (10.0.0.1). Prior to product installation, follow the procedures based on your configuration method:

- If you plan to configure the router through the management Ethernet port (using the SANsurfer Router Manager or CLI via telnet), you must initially configure the workstation as described in [“Setting the Workstation IP Address” on page 3-10](#).
- If you plan to configure the router using the management COM port, configure the workstation as described in [“Configuring the Workstation Serial Port” on page 3-11](#).

Setting the Workstation IP Address

The IP address of a new router is 10.0.0.1. To ensure that your workstation is configured to communicate with the 10.0.0.0 subnet, refer to the following instructions for your workstation:

- Steps for different versions of Windows vary. For a Windows 2000 workstation, do the following:
 - a. From the Windows **Start** menu, select **Settings>Control Panel>Network and Dial-up Connections**.
 - b. Click **Make New Connection**.
 - c. Click **Connect to a private network through the Internet**, then click **Next**.
 - d. Enter 10.0.0.253 for the IP address.
- For different versions of Windows, consult the Windows Help files.
- For Linux or Solaris workstation, open a command window and enter the following command, where *<interface>* is your interface name:

```
ifconfig <interface> ipaddress 10.0.0.253 netmask 255.255.255.0 up
```

Configuring the Workstation Serial Port

To configure the workstation serial port:

1. Connect the cable with RJ45 to DB9F adapter from a COM port on the management workstation to the serial port on the router.
2. Configure the workstation serial port according to your platform. These steps may vary according to the version of operating system you use:

■ For Windows:

- a. Open the HyperTerminal application. From the Windows **Start** menu, select **Programs>Accessories>HyperTerminal>HyperTerminal**.
- b. Enter a name for the router connection, choose an icon in the Connection Description window, then click **OK**.
- c. Enter the following **COM Port** settings in the COM Properties window and click **OK**.
Bits per second – 115200
Data Bits – 8
Parity – None
Stop Bits – 1
Flow Control – None

■ For Linux:

- a. Set up minicom to use the serial port. Create or modify the `/etc/minirc.dfl` file with the following content:

```
pr portdev/ttyS0
pu minit
pu mreset
pu mhangup
pr portdev/ttyS0
```

 specifies port 0 on the workstation. Choose the `pr` setting to match the workstation port to which you connected the router.
- b. Verify that all users have permission to run minicom. Review the `/etc/minicom.users` file and confirm that the line `ALL` exists or that there are specific user entries.

- ### ■ For Solaris – Modify the `/etc/remote` file to include the following lines. `/dev/term/a` refers to serial port a. Choose the “dv” setting to match the workstation port to which you connected the router.
- ```
\:dv=/dev/term/a:br#115200:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

3. Connect the router to the power (see [page 3-13](#)).

## Install SANsurfer Router Manager

You can manage the router using the SANsurfer Router Manager application. The following sections describe how to install the application on either a Windows or Linux workstation. See the *iSR6200 Router Manager User's Guide* for information on how to use SANsurfer Router Manager.

### Windows Installation

**To install the SANsurfer Router Manager application from the QLogic website to a PC workstation:**

1. Close all programs currently running.
2. Go to the QLogic download site:  
[http://support.qlogic.com/support/drivers\\_software.aspx](http://support.qlogic.com/support/drivers_software.aspx)
3. Select the **Intelligent Storage Routers** icon.
4. Select **iSR6250** in the product selection window and click **Go**.
5. Under the product name column, select the link to the SANsurfer Router Manager for your operating system.
6. Read the license agreement and click **Agree**.
7. Follow the system prompts to uncompress and install the application.

### Linux Installation

**To install the SANsurfer Router Manager application from the QLogic website to a Linux workstation:**

1. Go to the QLogic download site:  
[http://support.qlogic.com/support/drivers\\_software.aspx](http://support.qlogic.com/support/drivers_software.aspx)
2. Select the **Intelligent Storage Routers** icon.
3. Select **iSR6250** in the product selection window and click **Go**.
4. Under the product name column, select the link to the SANsurfer Router Manager for your operating system.
5. Read the license agreement and click **Agree**.
6. Save the file to your local system.
7. Uncompress the downloaded file and execute the `Linux_x.xx.bin` install program.
8. Follow the installation instructions.

## Start SANsurfer Router Manager

For Windows, double-click the SANsurfer Router Manager shortcut, or select **SANsurfer Router Manager** from the **Start** menu, depending on how you installed the SANsurfer Router Manager application.

From a Windows command line, enter the following command:

```
<install_directory>SANsurfer_Router_Manager.exe
```

From a Linux command prompt, enter the following command:

```
<install_directory>./SANsurfer_Router_Manager
```

## Configure the Router

You can configure the router using the SANsurfer Router Manager application or the command line interface (CLI).

The SANsurfer Router Manager provides a Configuration Wizard you can use to configure the GE ports. If either of the router's GE ports have not been configured (IP address is 0.0.0.0), the Configuration Wizard starts automatically when the Router Manager first connects with the router. The system uses the information collected in [Table 3-2](#) and [Table 3-3](#).

### To configure the router using the command line interface:

1. Open a command window according to the type of workstation and connection:
  - **Ethernet** (all platforms): Open a telnet session with the default router IP address and log in to the router with the default account name and password (guest/password):

```
telnet 10.0.0.1
username: guest
password: *****
```
  - **Serial – Windows**: Open the HyperTerminal application on a Windows platform:
    - a. From the Windows **Start** menu, select **Programs > Accessories, HyperTerminal > HyperTerminal**.
    - b. Select the connection you created earlier and click **OK**.
  - **Serial – Linux**: Open a command window and enter the following command:

```
minicom
```

2. Open an admin session and enter the commands to set up both iSCSI ports and the management interface. See the *iSR6200 Router CLI User's Guide* for command descriptions.

```
QRouter #> admin start
Password : ******
QRouter (admin) #> set mgmt
.....
QRouter (admin) #> set iscsi 1
.....
QRouter (admin) #> set iscsi 2
.....
```

## Cable Devices to the Router

Connect cables to the SFP transceivers and their corresponding devices. Devices can have SFP (or SFF) transceivers or gigabit interface converters (GBIC). Choose the fiber optic cable with the connector combination that matches the device being connected to the router:

- LC-type duplex fiber optic cable connectors are designed for SFP transceivers.
- SC-type connectors are designed for GBICs.
- OM-3 connectors are designed for 10Gb ports.

## Firmware Installation

The router comes with current firmware installed. You can upgrade the firmware from the management workstation as new firmware becomes available. You can use the SANsurfer Router Manager application or the CLI to install new firmware.

### **WARNING!!**

Installing new firmware disrupts the router blade connectivity since you must reboot the router blade to activate the new firmware.

## Using SANsurfer Router Manager to Install Firmware

To install firmware using the SANsurfer Router Manager:

1. Double-click the desired router in the topology display.
2. In the Firmware Upload window, click **Select** to navigate to and select the firmware to upload it.
3. Click **Start** to begin the firmware load process. A message warns you that the router will be reset to activate the firmware.
4. Click **OK** to continue firmware installation or click **Cancel** to cancel the firmware installation.

## Using the CLI to Install Firmware

To use CLI to install the firmware, transfer the firmware image file from a workstation to the router. Then use the CLI `image unpack` command to install the new firmware image:

1. At the workstation prompt, use the `ftp` command to go to the location on the router where you want to transfer the firmware image. For example:

```
C:\fwImage>ftp 172.17.137.190
Connected to 172.17.137.190.
220 (none) FTP server (GNU inetutils 1.4.2) ready.
```

2. Enter your username and password. For example:

```
User (172.17.137.190:(none)): ftp
331 Guest login ok, type your name as password.
Password: ftp
230 Guest login ok, access restrictions apply.
```

3. At the `ftp` prompt, type `bin` to set binary mode. For example:

```
ftp> bin
200 Type set to I.
```

4. Use the `put` command to transfer the firmware image file from the workstation to the router. For example:

```
ftp> put isr-6200-3_0_0_5.bin
200 PORT command successful.
150 Opening BINARY mode data connection for
'isr-6200-3_0_0_5.bin'.
226 Transfer complete.
ftp: 4822816 bytes sent in 0.41Seconds
11878.86Kbytes/sec.
```

5. Enter `quit`. The firmware image has been transferred to the router.
6. Log on to the router as an administrator.

7. Enter the following command from the router, where x stands for the firmware image name:

```
image unpack isr-62xx-x_x_x_x.bin
```

The following message displays:

```
Unpack Completed. Please reboot the system for FW to
take effect.
```

8. Enter `reboot`. The following message displays:

```
Are you sure you want to reboot the System (y/n):
```

9. Type `y` to reboot the system.

# 4 Configuration

This section describes how to configure the iSR6250 router to support virtual port groups (VPGs) and LUN mapping.

Some storage arrays limit the number of LUNs exposed to a host to 256 LUNs. Each iSR6250 router blade supports up to four virtual port groups (VPGs), making it possible for these storage arrays to present up to 1024 LUNs per blade.

When configuring VPGs on the iSR6250 router, follow these guidelines:

- All Fibre Channel (FC) virtual ports from a single VPG must be part of only one logical host on the storage array.
- FC ports from different VPGs must not be part of the same logical host on the storage array.
- A given LUN can be presented to one and only one VPG. It can be presented to other FC hosts, but only one VPG on a given iSR6250 router (chassis).

The following sections describe how to configure VPGs and the Fibre Channel arrays connected to them:

- [“Enabling Virtual Port Groups” on page 4-2](#)
- [“Zoning Virtual Port Groups on the SAN” on page 4-9](#)
- [“Configuring FC Array Hosts and LUN Assignments with the iSR6250” on page 4-10](#)
- [“Connecting iSCSI Hosts to your iSR6250” on page 4-13](#)
- [“Controlling per Host LUN Access on the iSR6250” on page 4-20](#)

## Enabling Virtual Port Groups

Each iSR6250 router blade has one virtual port group (VPG) enabled by default, which gives the iSCSI hosts access to 256 LUNs. You can enable and configure additional VPGs to give the iSCSI hosts access to more than 256 distinct LUNs from a given FC Target Array.

Each blade has VPG 1 enabled by default; VPG 1 is the primary virtual port group and cannot be disabled. Enabling additional virtual port groups creates additional logical FC HBA initiator ports on the fabric. These ports act as separate FC HBA host ports, and additional 256 LUNs can be presented to each of them. With all four VPGs enabled, a single iSR6250 blade can access up to 1024 LUNs from a single target WWPN.

You can display virtual port group information using the `show vpgroups` command in the CLI, as shown in the following example.

```
iSR6200 <1> (admin) #> show vpgroups
```

### VpGroup Information

-----

|              |                                                    |
|--------------|----------------------------------------------------|
| Index        | 1                                                  |
| VpGroup Name | VPGROUP_1                                          |
| Status       | Enabled                                            |
| WWPNs        | 21:00:00:c0:dd:13:16:f8<br>21:00:00:c0:dd:13:16:f9 |

|              |           |
|--------------|-----------|
| Index        | 2         |
| VpGroup Name | VPGROUP_2 |
| Status       | Disabled  |
| WWPNs        | N/A       |

|              |           |
|--------------|-----------|
| Index        | 3         |
| VpGroup Name | VPGROUP_3 |
| Status       | Disabled  |
| WWPNs        | N/A       |

|              |           |
|--------------|-----------|
| Index        | 4         |
| VpGroup Name | VPGROUP_4 |
| Status       | Disabled  |
| WWPNs        | N/A       |

Using the SANsurfer Router Manager, select one of the VPGroup icons in the left panel to display that VPGroups information in the right panel.

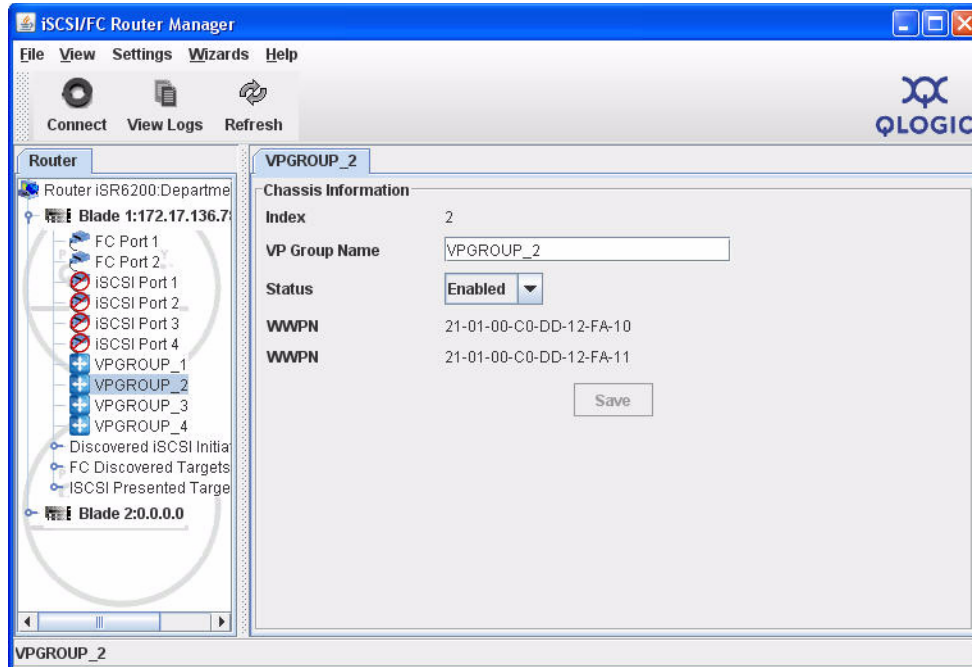


**Figure 4-1 SANsurfer Router Manager VPGroup**

You can enable or disable virtual port groups on your blade using either the GUI or the CLI. The following example shows how to enable this VPGroups 2 and 3 using the CLI `set vpgroups` command.

```
iSR6200 <1> (admin) #> set vpgroups
```

The following wizard will query for attributes before persisting and activating the updated mapping in the system configuration. If you wish to terminate this wizard before reaching the end of the list press 'q' or 'Q' and the ENTER key to do so.

Configuring VpGroup: 1

-----

|                                    |              |
|------------------------------------|--------------|
| Status (0=Enable, 1=Disable)       | [Enabled ]   |
| VpGroup Name (Max = 64 characters) | [VPGROUP_1 ] |

All attribute values for VpGroup 1 that have been changed will now be saved.

Configuring VpGroup: 2

-----

|                                    |              |   |
|------------------------------------|--------------|---|
| Status (0=Enable, 1=Disable)       | [Disabled ]  | 0 |
| VpGroup Name (Max = 64 characters) | [VPGROUP_2 ] |   |

All attribute values for VpGroup 2 that have been changed will now be saved.

Configuring VpGroup: 3

-----

|                                    |              |   |
|------------------------------------|--------------|---|
| Status (0=Enable, 1=Disable)       | [Disabled ]  | 0 |
| VpGroup Name (Max = 64 characters) | [VPGROUP_3 ] |   |

All attribute values for VpGroup 3 that have been changed will now be saved.

Configuring VpGroup: 4

-----

|                              |             |
|------------------------------|-------------|
| Status (0=Enable, 1=Disable) | [Disabled ] |
|------------------------------|-------------|

All attribute values for VpGroup 4 that have been changed will now be saved.

**To enable or disable a VPGROUP using the SANsurfer Router Manager:**

1. Select the VPGROUP in the system tree. The right panel displays information about the selected VPGROUP.
2. Select **Enabled** or **Disabled** from the **Status** drop-down menu. (See [Figure 4-2.](#))

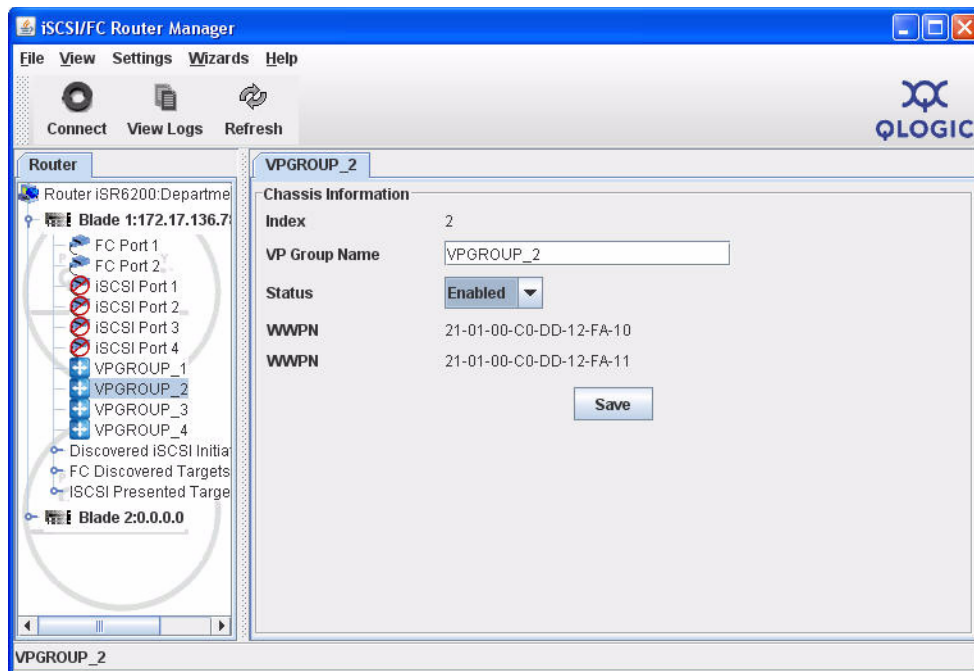


**Figure 4-2 Chassis Information for Selected VPGROUP**

3. Click **Save**. A System Check dialog box prompts you to enter a password.
4. Enter the system password and click **OK**. The Set VPGroup message box opens, as shown in [Figure 4-3.](#)

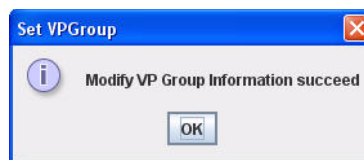


**Figure 4-3 Set VPGroup Message Box**

5. Click **OK** to close the message box.

The following example shows CLI command output using an iSR6250 blade with 3 virtual port groups enabled. You can display information about the virtual port groups configured on your iSR6250 using the `show vpgroups` command.

```
iSR6200 <R1> #> show vpgroups
```

```
iSR6200 <1> (admin) #> show vpgroups
```

VpGroup Information

-----

|              |                                                                                      |
|--------------|--------------------------------------------------------------------------------------|
| Index        | 1                                                                                    |
| VpGroup Name | VPGROUP_1                                                                            |
| Status       | Enabled                                                                              |
| WWPNs        | 21: <b>00</b> :00:c0:dd:13:16: <i>f8</i><br>21: <b>00</b> :00:c0:dd:13:16: <i>f9</i> |
| Index        | 2                                                                                    |
| VpGroup Name | VPGROUP_2                                                                            |
| Status       | Enabled                                                                              |
| WWPNs        | 21: <b>01</b> :00:c0:dd:13:16: <i>f8</i><br>21: <b>01</b> :00:c0:dd:13:16: <i>f9</i> |
| Index        | 3                                                                                    |
| VpGroup Name | VPGROUP_3                                                                            |
| Status       | Enabled                                                                              |
| WWPNs        | 21: <b>02</b> :00:c0:dd:13:16: <i>f8</i><br>21: <b>02</b> :00:c0:dd:13:16: <i>f9</i> |
| Index        | 4                                                                                    |
| VpGroup Name | VPGROUP_4                                                                            |
| Status       | Disabled                                                                             |
| WWPNs        | N/A                                                                                  |

In these examples, the second byte from the left (in **bold** text) denotes the virtual port group ID, while the right-most byte (in *italic* text) denotes the physical FC port. In these examples VPGs 1 through 3 have corresponding VPs with **00**, **01**, and **02** presented out of physical FC ports 0 and 1, with WWPNs ending in *f8* and *f9*, respectively.

The following example shows the information grouped by physical FC port.

```
iSR6200 <1> (admin) #> show fc
```

FC Port Information

```

FC Port 1
Port Status Enabled
Link Status Up
Current Link Rate 4Gb
Programmed Link Rate
Auto
WWNN 20:00:00:c0:dd:13:16:f8 (VPGROUP_1)
WWPN 21:00:00:c0:dd:13:16:f8 (VPGROUP_1)
Port ID 0a-04-00 (VPGROUP_1)
WWNN 20:01:00:c0:dd:13:16:f8 (VPGROUP_2)
WWPN 21:01:00:c0:dd:13:16:f8 (VPGROUP_2)
Port ID 0a-04-01 (VPGROUP_2)
WWNN 20:02:00:c0:dd:13:16:f8 (VPGROUP_3)
WWPN 21:02:00:c0:dd:13:16:f8 (VPGROUP_3)
Port ID 0a-04-02 (VPGROUP_3)
Firmware Revision No.
4.05.00
Frame Size 2048
Execution Throttle
32768
Connection Mode Point-to-Point
Programmed Connection Option
Loop Preferred
SFP Type 8Gb

FC Port 2
Port Status Enabled
Link Status Up
Current Link Rate 4Gb
Programmed Link Rate
Auto
WWNN 20:00:00:c0:dd:13:16:f9 (VPGROUP_1)
WWPN 21:00:00:c0:dd:13:16:f9 (VPGROUP_1)
Port ID 0a-05-00 (VPGROUP_1)
WWNN 20:01:00:c0:dd:13:16:f9 (VPGROUP_2)
WWPN 21:01:00:c0:dd:13:16:f9 (VPGROUP_2)
Port ID 0a-05-01 (VPGROUP_2)
WWNN 20:02:00:c0:dd:13:16:f9 (VPGROUP_3)
WWPN 21:02:00:c0:dd:13:16:f9 (VPGROUP_3)
```

```

Port ID 0a-05-02 (VPGROUP_3)
Firmware Revision No. 4.05.00
Frame Size 2048
Execution Throttle 32768
Connection Mode Point-to-Point
Programmed Connection Option Loop Preferred
SFP Type 8Gb

```

```
iSR6200 <1> (admin) #>
```

Notice also the VP index in the second byte from the left, and the FC port indicator in the right-most byte.

To see this information using the SANsurfer Router Manager, select one of the Fibre Channel ports, as shown in the following example.

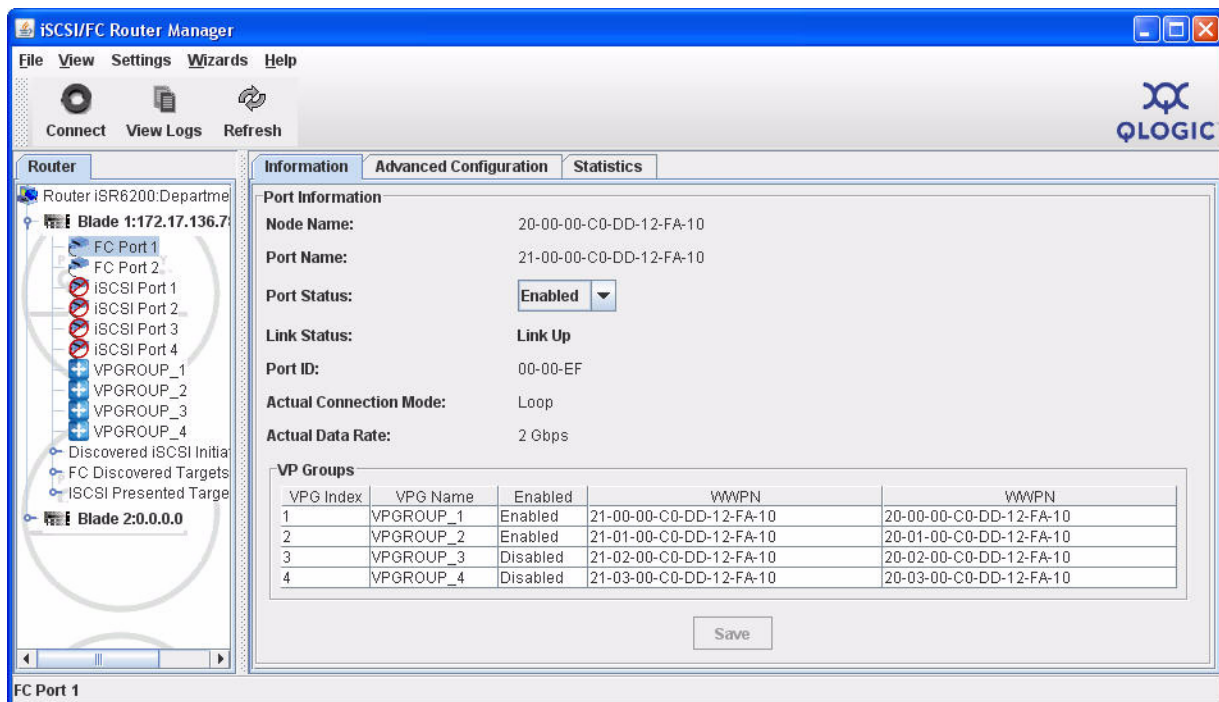


**Figure 4-4 FC Port Information Tab**

**NOTE:**

For more details on using the application, use the *SANsurfer Router Manager Application Help* or refer to the *iSR6200 Router Manager User's Guide*.

## Zoning Virtual Port Groups on the SAN

When connecting the iSR6250 for high availability, connect one FC port from each blade to each of your fabrics (see [Figure 4-5](#)). This topology provides link-level, switch-level, and blade-level failure protection. To make this effective, you must connect the iSCSI hosts to both iSR6250 blades. For details, see [“Connecting iSCSI Hosts to your iSR6250” on page 4-13](#).

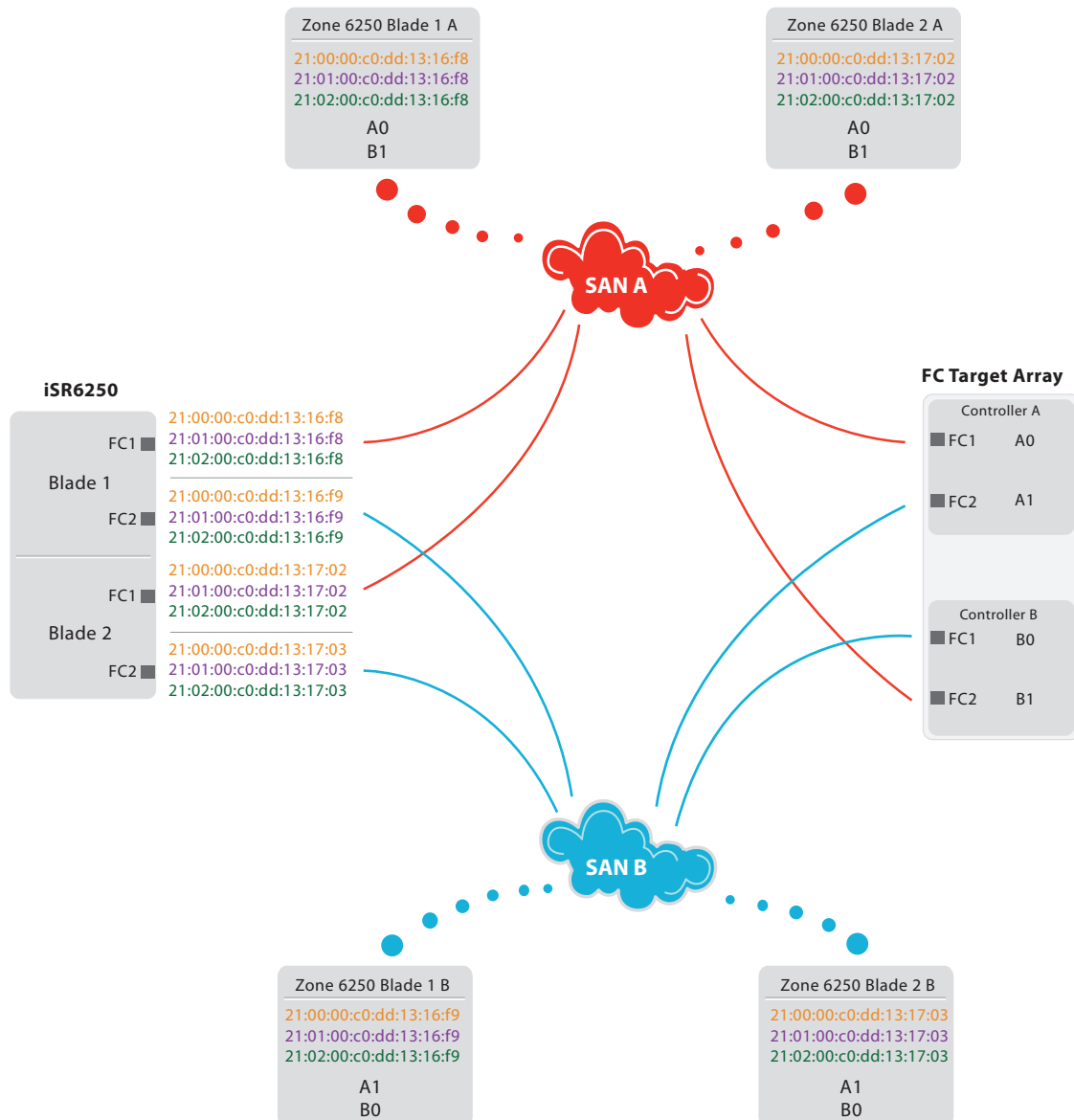


**Figure 4-5 High-Availability, Dual Blades, Dual FC Switches**

## Configuring FC Array Hosts and LUN Assignments with the iSR6250

When configuring FC array hosts, you must treat each iSR6250 virtual port group (VPG) as its own unique FC host within the virtualized storage array. This means if you have only one VPG enabled, the iSR6250 will have only one host entity. If you enable two more VPGs, the iSR6250 will present three separate host entities to your storage array.

When using the iSR6250 in a high availability configuration, assign each VPG from the second iSR6250 blade in the same chassis to the same host entity as VPG from blade 1.

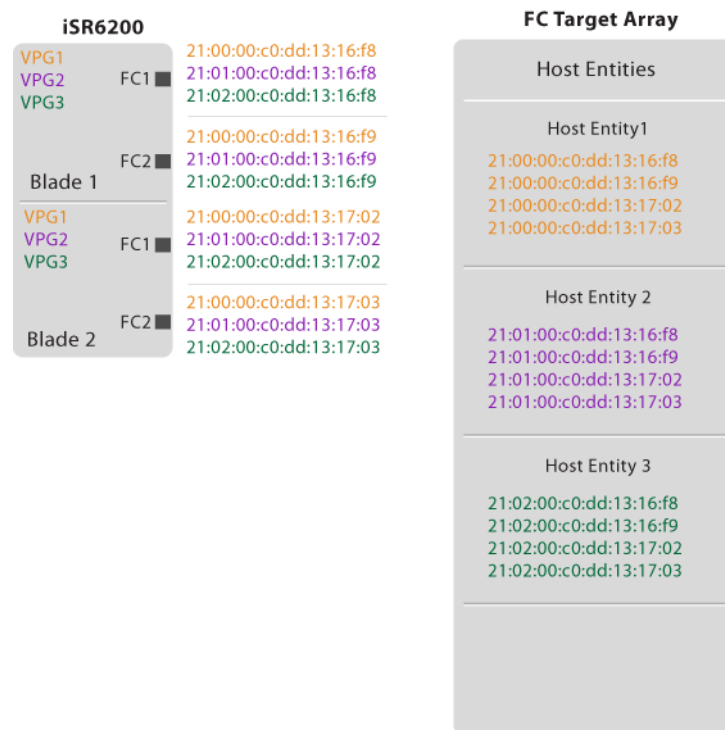


**Figure 4-6 Correct VPG Assignments for High Availability Configuration**

Do not put VPG ports in Host entities with other FC hosts.

When assigning LUNs to your VPG host entities, you must not assign the same LUN to two VPG Host entities. [Figure 4-7](#) shows a valid LUN presentation. Each LUN is presented to only one VPG. Any of these LUNs can be presented to any number of other FC hosts on the array; but can be presented to one and only one VPG of the iSR6250.

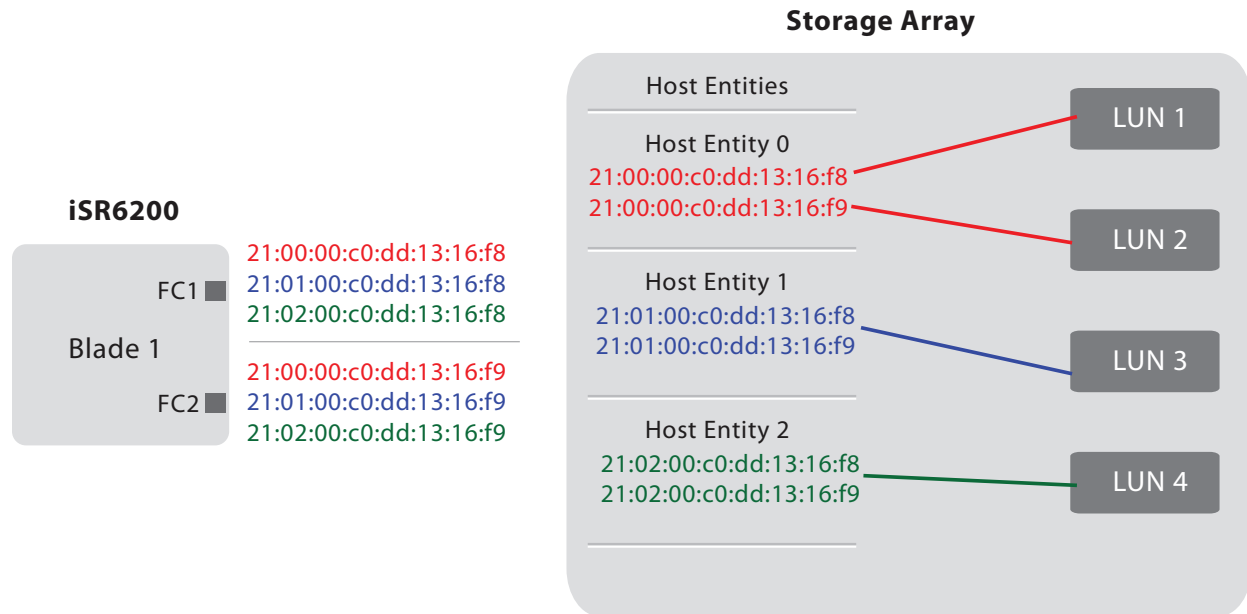


**Figure 4-7 Correctly Assigning LUNs to your VPG Host Entities**

Figure 4-8 shows presenting LUN 3 incorrectly. If an iSCSI host logged into both VPG0 and VPG1 it will have access to LUN 3 through 2 Virtual port groups. This is invalid and will lead to serious problems.

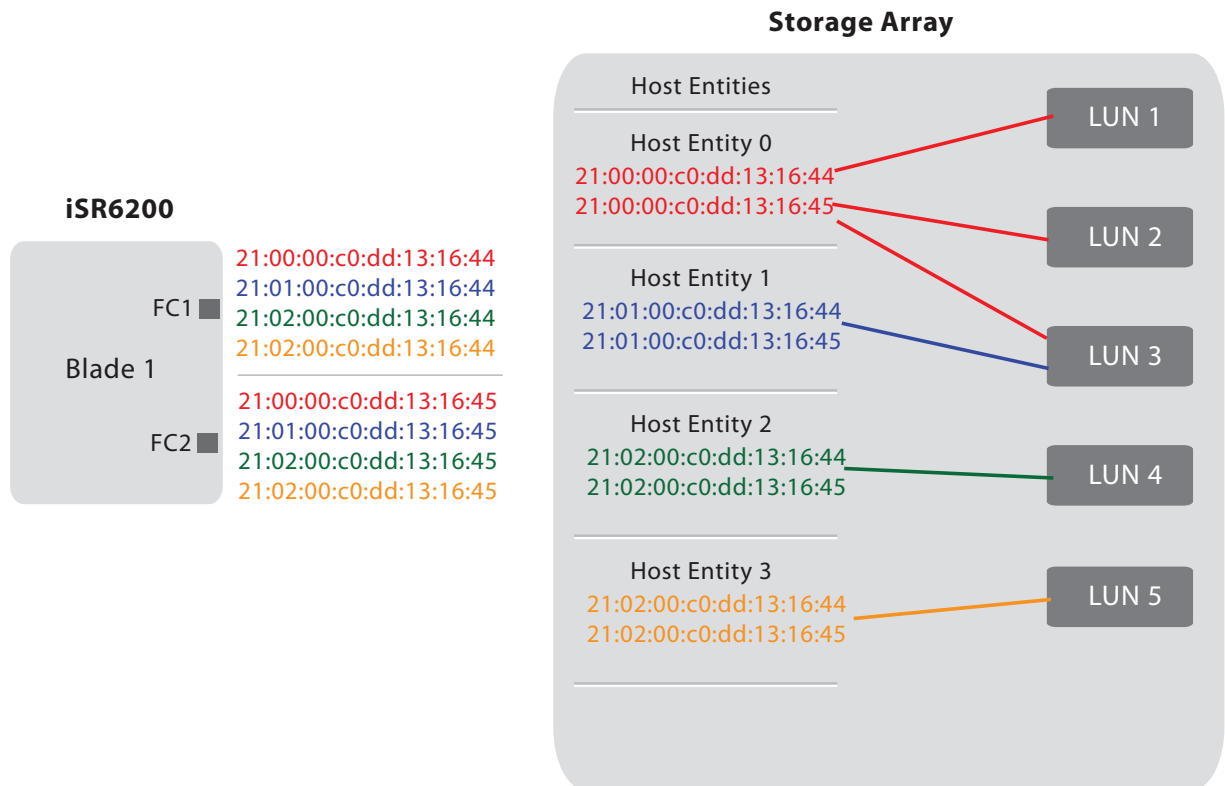


**Figure 4-8 Incorrectly Presenting LUN 3**

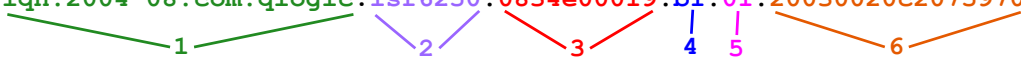
Presenting the LUN at different LUN indexes for each VP will confuse the iSCSI host MPIO software because it will see the same LUN WWLUNID at two different indexes. This would cause the MPIO driver to panic or crash. Without an MPIO driver, the system could corrupt data on the LUN, without crashing. This is something you want to avoid.

## Connecting iSCSI Hosts to your iSR6250

Upon logging into a Fibre Channel target WWPN, an iSR6250 blade will present an iSCSI Target for iSCSI initiators to connect to. This target is defined by its iSCSI Qualified Name (IQN) string. To connect iSCSI initiators to Fibre Channel targets through the iSR6250 correctly, *it is important to understand the composition of the iSCSI target IQN string.*

The following example shows the anatomy of a sample IQN string from an iSR6250 router:

`iqn.2004-08.com.qlogic:isr6250.0834e00019.b1.01.20030020c2075970`



1. **Vendor name and registration date**
2. **Product Name**
3. **iSR6250 Chassis Serial Number**
4. **Blade (b1 or b2)**
5. **VPGroup (01 through 04)**
6. **FC target WWPN**

Notice that the IQN string does not contain any information about which iSR6250 physical iSCSI port you are connecting to. iSCSI load balancing and failover are handled by the iSCSI host and not on the iSR6250.

Also notice the IQN string does not contain any information about which physical Fibre Channel port on the iSR6250 the FC target device is attached through.

You can display the complete list of IQN strings your iSR6250 is presenting with the `show presented_targets` command in the CLI. For example:

```
iSR6200 <1> (admin) #> show presented_targets
```

```
Presented Target Information
```

```

```

```
iSCSI Presented Targets
```

```

```

```
Name
```

```
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.01.20030020c2075970
```

```
Alias
```

```
<MAPS TO>
```

```
WWNN 10:00:00:20:c2:07:59:70
```

```
WWPN 20:03:00:20:c2:07:59:70
```

```
Name
```

```
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.01.21040020c2075970
```

```
Alias
```

```
<MAPS TO>
```

```
WWNN 10:00:00:20:c2:07:59:70
```

```
WWPN 21:04:00:20:c2:07:59:70
```

To display presented target information using the SANsurfer Router Manager, expand the iSCSI Presented Targets tree and select the device, as shown in Figure 4-9.

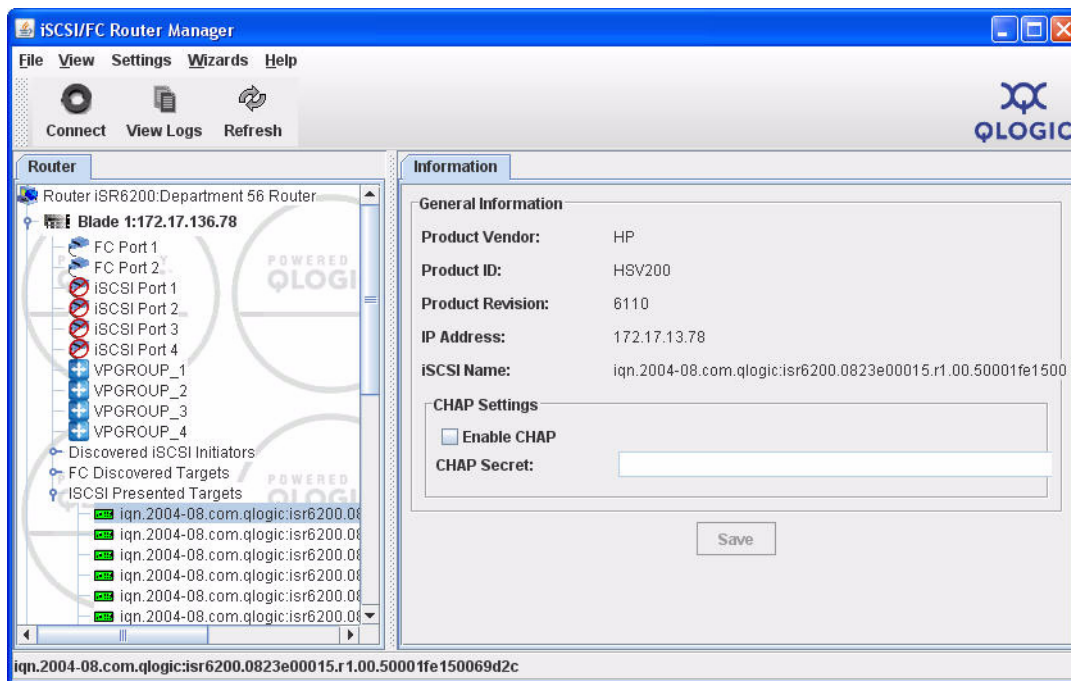


**Figure 4-9 Selecting the iSCSI Presented Targets in the SANsurfer Router Manager**

Enabling additional VPGroups can create multiple IQN strings for the same Fibre Channel WWPN. The example below shows two FC target WWPNs and three VP groups. This leads to a total of six presented iSCSI qualified names. For information about how to enable and configure additional VPGroups, see [“Enabling Virtual Port Groups” on page 4-2](#).

```
iSR6200 <1> (admin) #> show targets
```

Target Information

```

WWNN 10:00:00:20:c2:07:59:70
WWPN 20:03:00:20:c2:07:59:70
Port ID 0a-02-00
State Online

WWNN 10:00:00:20:c2:07:59:70
WWPN 21:04:00:20:c2:07:59:70
Port ID 0a-03-00
State Online
```

```
iSR6200 <1> #> show vpgroups
```

VpGroup Information

```

Index 1
VpGroup Name VPGROUP_1
Status Enabled
WWPNs 21:00:00:c0:dd:13:16:f8
 21:00:00:c0:dd:13:16:f9

Index 2
VpGroup Name VPGROUP_2
Status Enabled
WWPNs 21:01:00:c0:dd:13:16:f8
 21:01:00:c0:dd:13:16:f9

Index 3
VpGroup Name VPGROUP_3
Status Enabled
```

WWPNs 21:02:00:c0:dd:13:16:f8  
21:02:00:c0:dd:13:16:f9

Index 4  
VpGroup Name VPGROUP\_4  
Status Disabled  
WWPNs N/A

iSR6200 <1> (admin) #> show presented\_targets

Presented Target Information  
-----

iSCSI Presented Targets  
-----

Name  
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.01.20030020c2075970  
Alias  
<MAPS TO>  
WWNN 10:00:00:20:c2:07:59:70  
WWPN 20:03:00:20:c2:07:59:70

Name  
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.01.21040020c2075970  
Alias  
<MAPS TO>  
WWNN 10:00:00:20:c2:07:59:70  
WWPN 21:04:00:20:c2:07:59:70

Name  
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.02.20030020c2075970  
Alias  
<MAPS TO>  
WWNN 10:00:00:20:c2:07:59:70  
WWPN 20:03:00:20:c2:07:59:70

Name  
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.02.21040020c2075970  
Alias

```
<MAPS TO>
WWNN 10:00:00:20:c2:07:59:70
WWPN 21:04:00:20:c2:07:59:70

Name
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.03.20030020c2075970
Alias
<MAPS TO>
WWNN 10:00:00:20:c2:07:59:70
WWPN 20:03:00:20:c2:07:59:70

Name
iqn.2004-08.com.qlogic:isr6200.0834e00019.r1.03.21040020c2075970
Alias
<MAPS TO>
WWNN 10:00:00:20:c2:07:59:70
WWPN 21:04:00:20:c2:07:59:70
```

iSCSI host LUN access will be determined by the specific iSCSI target the host connects to, and the LUNs that VPG has access to from the storage array. Pay special attention to the VPG index of the IQN string you are logging into; it determines which group of LUNs on the Storage Array your host can access.

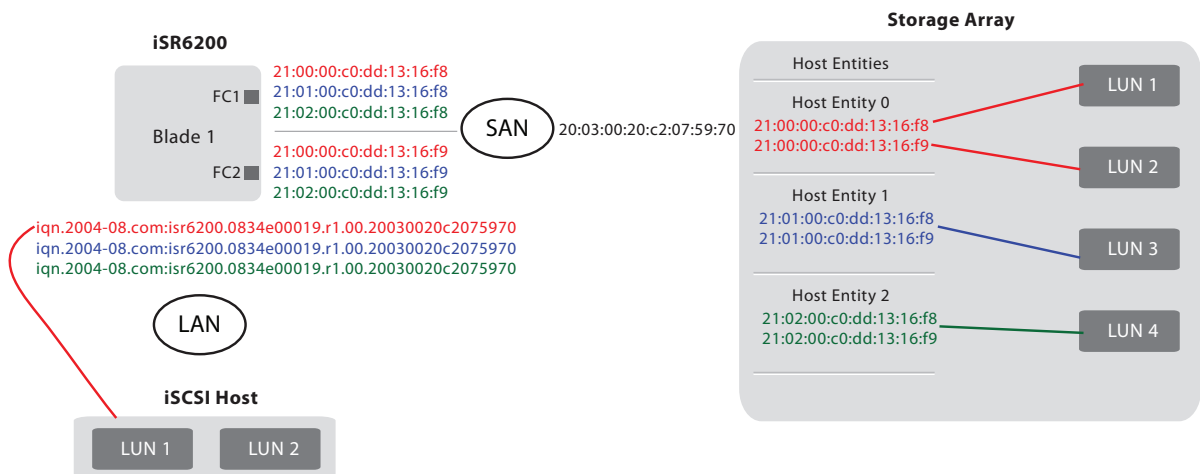


**Figure 4-10 Host Access to LUNs on Storage Array**

iSCSI host has logged into iSCSI target for VPG0. Host can access VPG0 LUNS #1 and #2 from storage array.

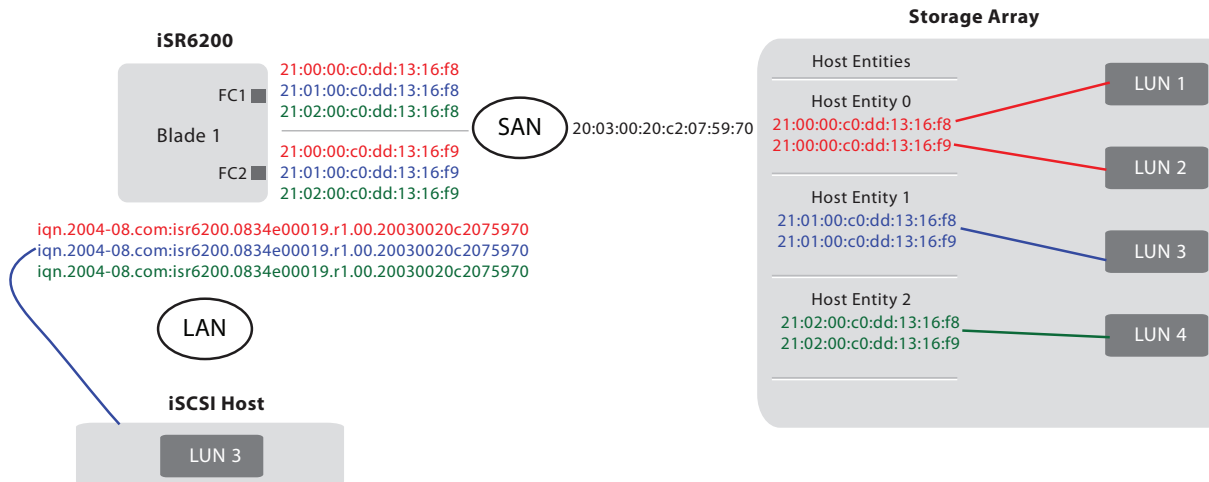


**Figure 4-11 iSCSI Host Logged into iSCSI Target for VPG0**

iSCSI host has logged into iSCSI target for VPG1. Host can access VPG1 LUN #3 from storage array.

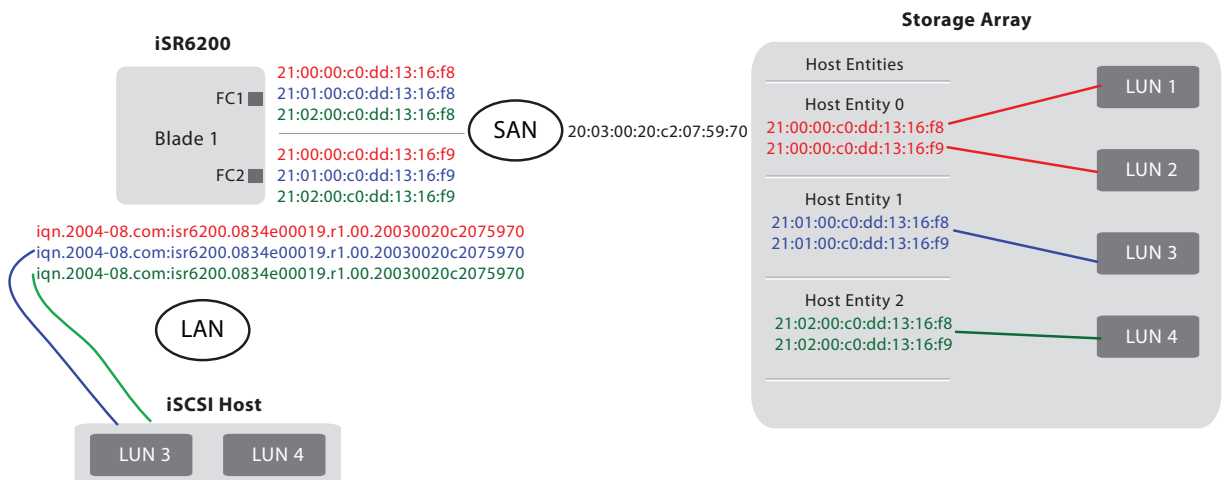


**Figure 4-12 iSCSI Host Logged into iSCSI Target for VPG1**

iSCSI host has logged into iSCSI targets for both VPG1 and VPG2. Host can access both VPG1 and VPG2 LUNs #3 and #4.

## Controlling per Host LUN Access on the iSR6250

The iSR6250 allows multiple iSCSI initiators to connect to a single FC target through a given VPG. Controlling individual LUN access for each iSCSI host requires *LUN mapping* devices connected through the iSR6250.

**NOTE:**

Before proceeding with this section, be sure you have read and understand the previous sections of this chapter.

Figure 4-13 shows that even after logging into the VPG0 iSCSI target, the host cannot access data LUNs on the storage array. To allow the iSCSI host access to each LUN, you must configure the iSR6250 using either the SANsurfer Router Manager or the command line interface (CLI).

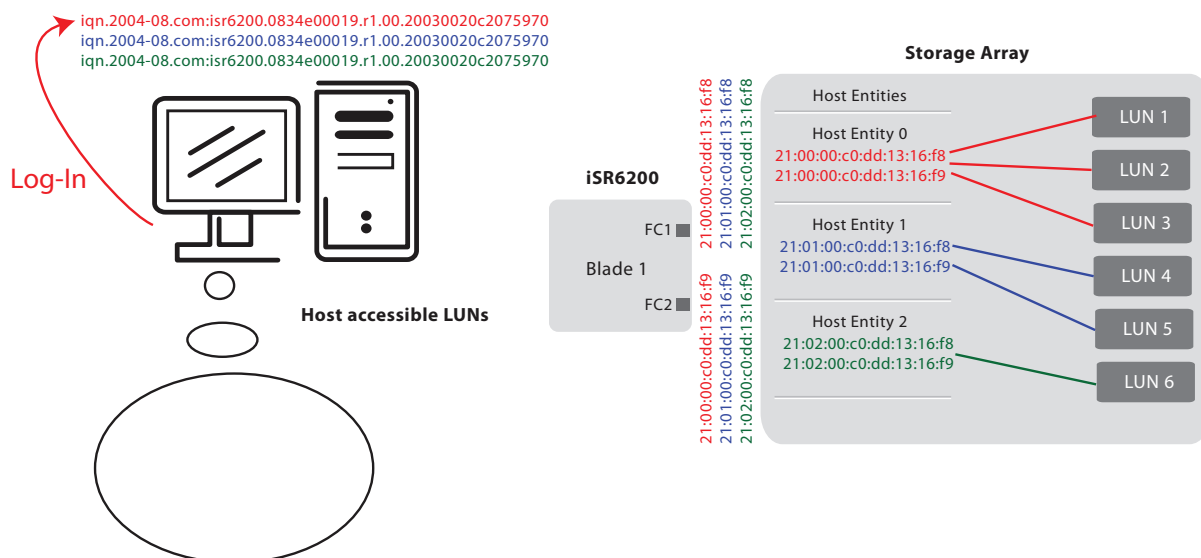


**Figure 4-13 Logging into Target Before LUN Mapping**

The following example shows how to map the LUN targets with initiators using CLI commands.

```
iSR6200 <1> (admin) #> lunmask add
```

Index	Mapped	(WWNN,WWPN/iSCSI Name)
0	Yes	iqn.1991-05.com.microsoft:winhaz38

Please select an Initiator from the list above ('q' to quit): 0

Index	(VpGroup Name)
1	VPGROUP_1
2	VPGROUP_2
3	VPGROUP_3
4	VPGROUP_4

Multiple VpGroups are currently 'ENABLED'.

Please select a VpGroup from the list above ('q' to quit): 1

Index	(WWNN,WWPN/iSCSI Name)
0	50:06:01:60:c1:e0:0d:a2,50:06:01:60:41:e0:0d:a2
1	50:06:01:60:c1:e0:0d:a2,50:06:01:68:41:e0:0d:a2

Please select a Target from the list above ('q' to quit): 0

Index	(LUN/VpGroup)	Vendor
1	1/VPGROUP_1	DGC
2	2/VPGROUP_1	DGC
3	3/VPGROUP_1	DGC

Please select a LUN to present to the initiator ('q' to quit): 1

All attribute values that have been changed will now be saved.

Figure 4-14 shows the effect of mapping an initiator to LUN 1 using the CLI commands shown in the previous example.

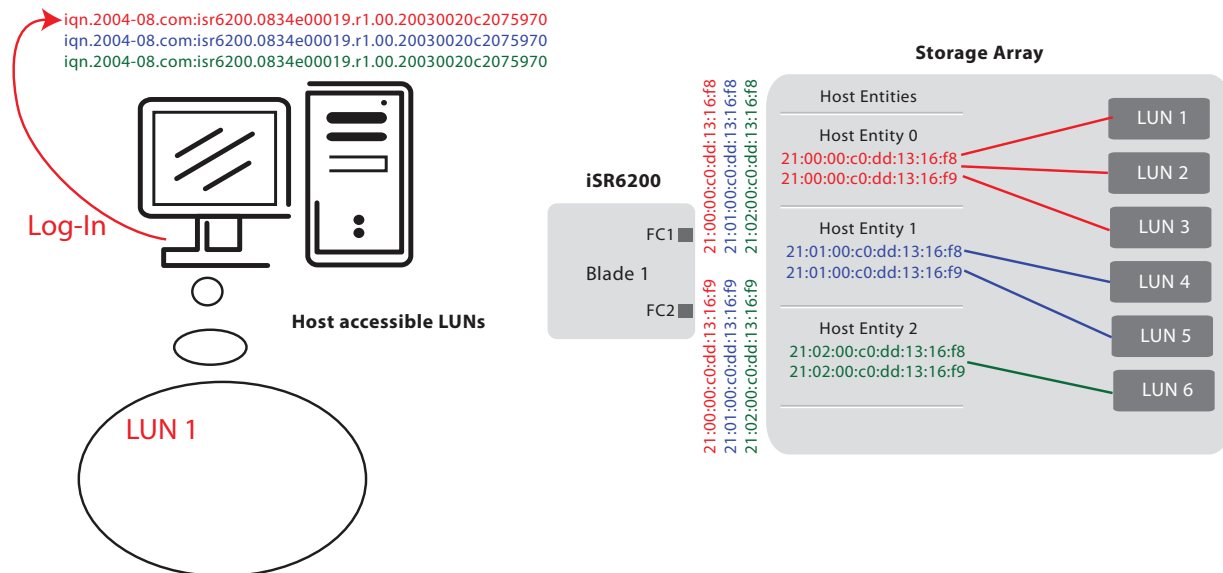


**Figure 4-14 Logging into Target After Mapping LUN 1**

You can accomplish the same LUN mapping using the SANsurfer Router Manager's Presentation Wizard.

**To map LUN 1 to an initiator using the Router Manager:**

1. Select **Presentation Wizard** from the **Wizards** menu.
2. Expand the router blade node (identified by its IP address), the virtual port group node, and the device node.
3. Select LUN1 as shown in Figure 4-15, then click **Next**.

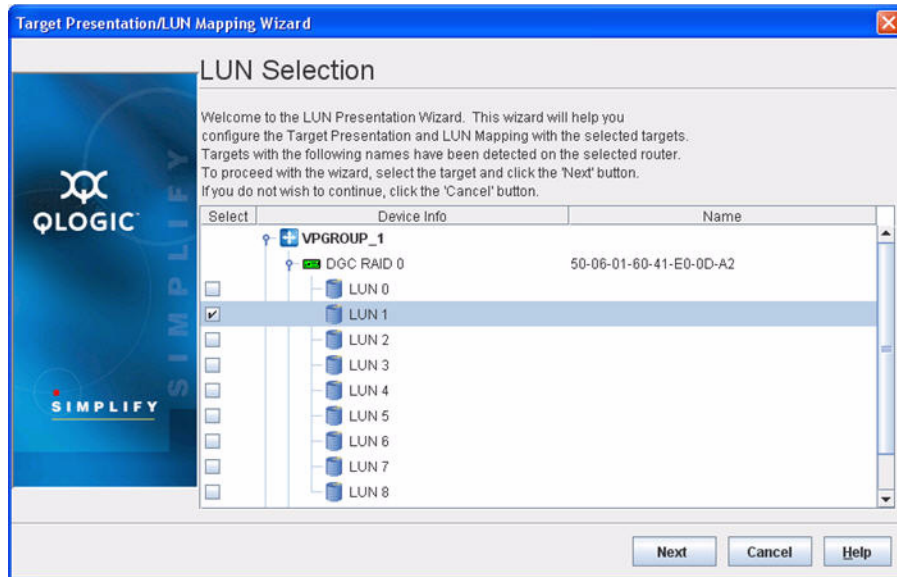


**Figure 4-15 Target Presentation/LUN Mapping Wizard - LUN Selection**

4. Select the check box next to the description of the initiators you want the LUNS mapped to, as shown in [Figure 4-16](#).

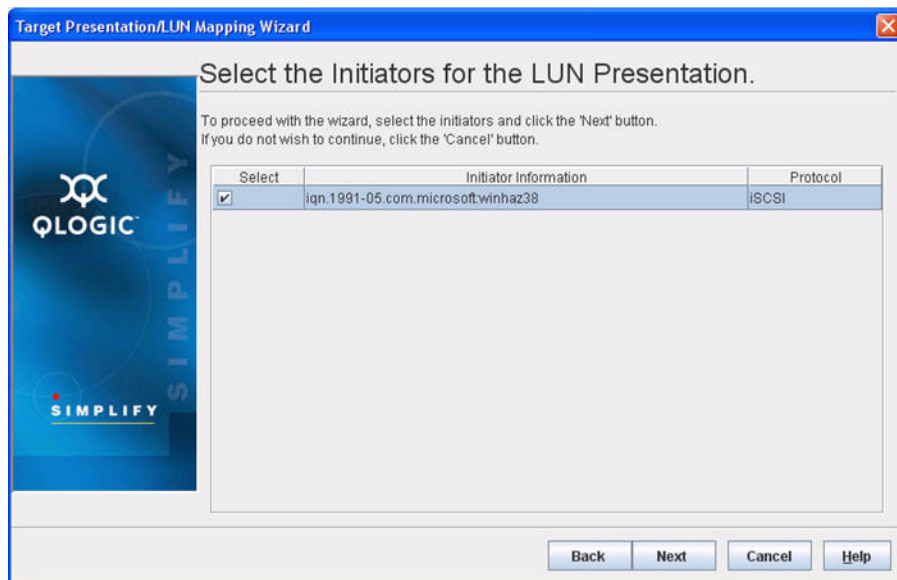


**Figure 4-16 Target Presentation/LUN Mapping Wizard - Select the Initiators**

5. Click **Next**. The Confirm Changes dialog box appears, displaying the configuration changes made to the selected LUN, as shown in [Figure 4-17](#).

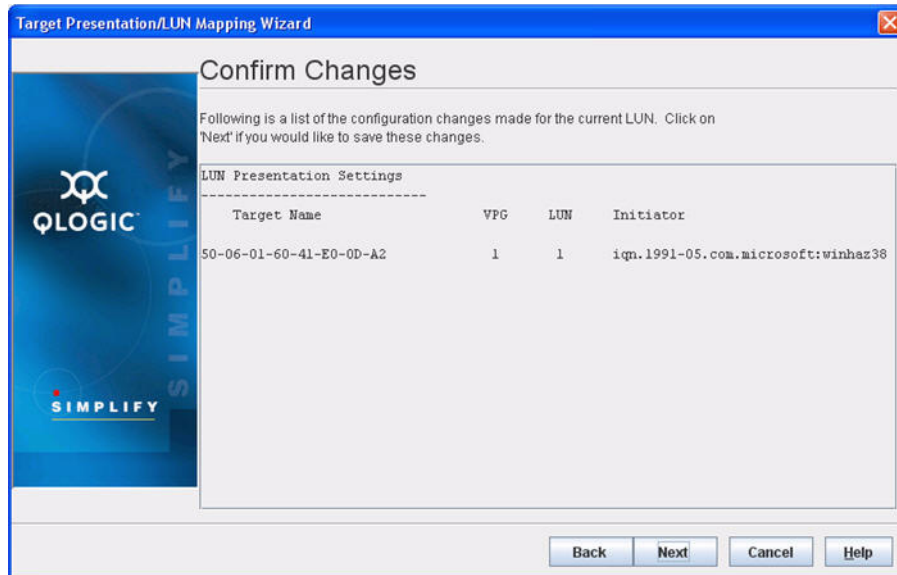


**Figure 4-17 Target Presentation/LUN Mapping Wizard - Confirm Changes**

- Review the configuration changes, then click **Next**. The LUN Masking Configuration Status dialog box appears, along with the Security Check dialog box, as shown in [Figure 4-18](#).

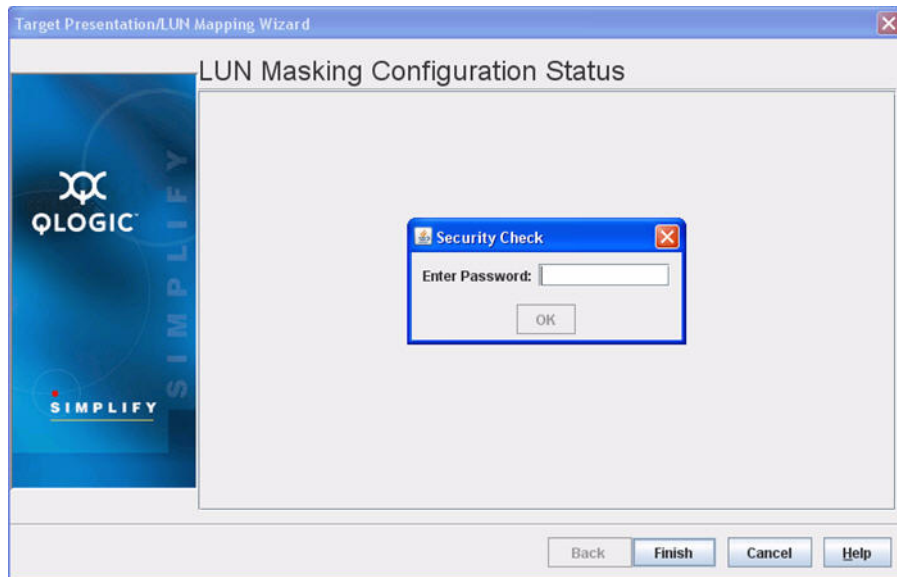


**Figure 4-18 Security Check Dialog Box**

7. In the Security Check dialog box, enter the system password, then click **OK**.

**NOTE:**

The default password is `config`.

The LUN Masking Configuration screen displays the mapping requests, as shown in [Figure 4-19](#).

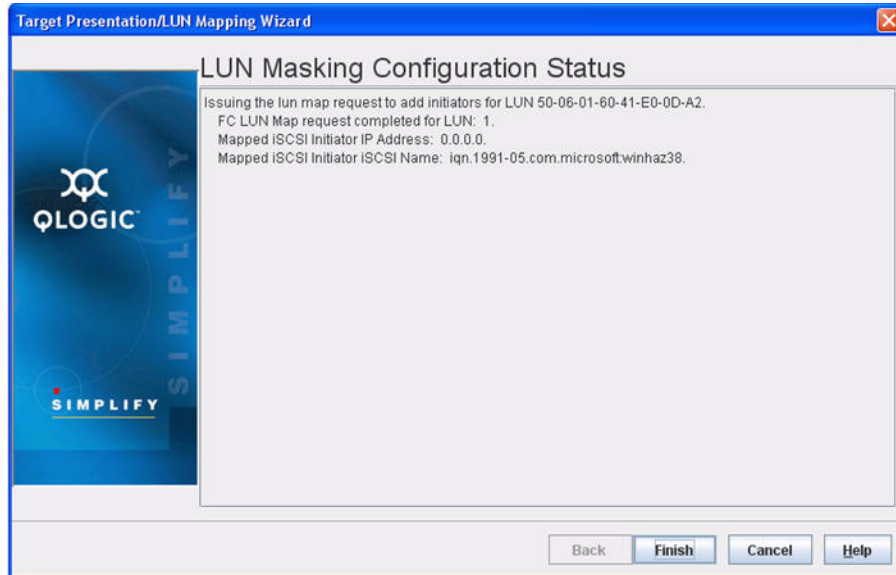


**Figure 4-19 Target Presentation/LUN Mapping Wizard - LUN Masking Configuration Status**

8. Verify the completion status displayed on the LUN Masking Configuration Status screen, then click **Finish**. The wizard screen closes.

You can map additional LUNs using either the SANsurfer Router Manager or the command line interface (CLI). The iSCSI host cannot access mapped LUNs until it logs into the presented target for the corresponding iSR6250 virtual port group and Fibre Channel target WWPN.

Figure 4-20 uses color coding to identify the LUN Mapping that became available after the host logged into the presented targets.

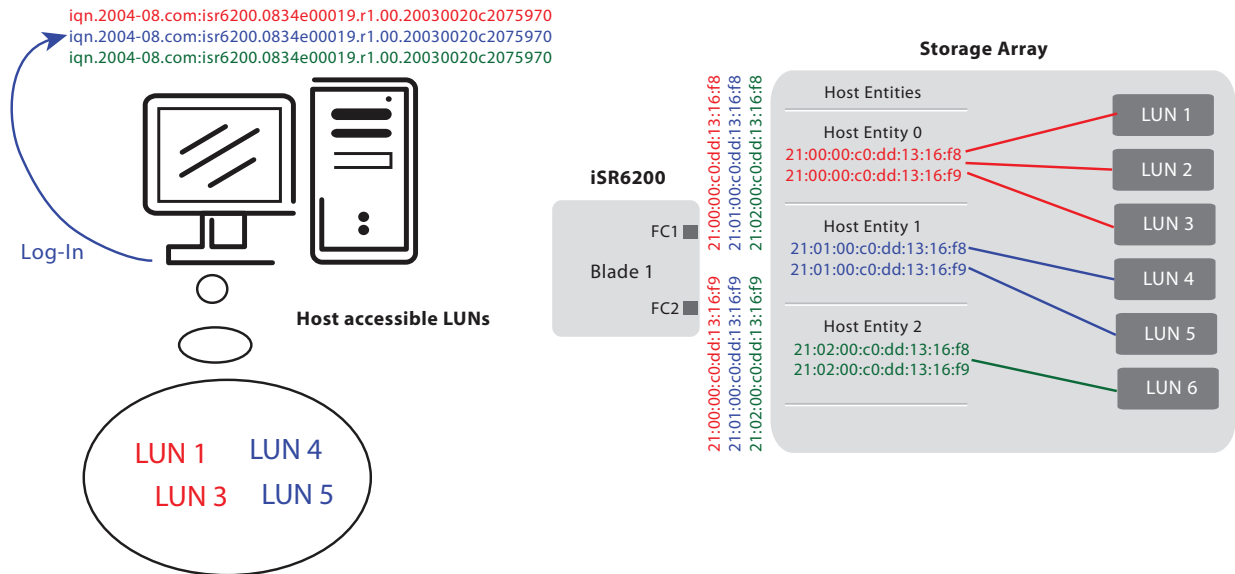


**Figure 4-20 Logging In with Mapped LUNs**

If you plan to allow all iSCSI hosts unrestricted access to all discovered FC LUNs, you can completely disable LUN mapping using either the SANsurfer Router Manager or CLI commands.

The following example shows how to do this using the `set system` CLI command. The red text shows entering the command that enables the LUN mapping.

```
iSR6200 <1> (admin) #> set system
```

A list of attributes with formatting and current values will follow.

Enter a new value or simply press the ENTER key to accept the current value.

If you wish to terminate this process before reaching the end of the list press 'q' or 'Q' and the ENTER key to do so.

WARNING:

If enabled by operator, the Symbolic Name can be embedded as part of the iSCSI Name. Changes to the iSCSI name will be effective after a reboot.

Only valid iSCSI name characters will be accepted. Valid characters include alphabetical (a-z, A-Z), numerical (0-9), colon, hyphen, and period.

Changes to the Settings below will be effective after a reboot.

System Symbolic Name (Max = 64 characters)	[Blade-1	]
Embed Symbolic Name (0=Enable,1=Disable)	[Disabled	]
Target Presentation Mode (0=Auto, 1=Manual)	[Auto	]
Lun Mapping (0=Enable, 1=Disable)	[Disabled	]
Controller Lun AutoMap (0=Enable, 1=Disable)	[Enabled	]
Target Access Control (0=Enable, 1=Disable)	[Disabled	]
Telnet (0=Enable, 1=Disable)	[Enabled	]
SSH (0=Enable, 1=Disable)	[Enabled	]

All attribute values that have been changed will now be saved.

#### NOTE:

- You must reboot the router to change the LUN mapping status, whether you're enabling it or disabling it.
- If you are running the iSR6250 in a High-Availability configuration, make sure both blades have the same setting.

Figure 4-21 shows how to select the enable option for LUN masking on iSR6250 blade 1. To apply these changes, you must click **Save**, enter the system password, and reboot the router blade.

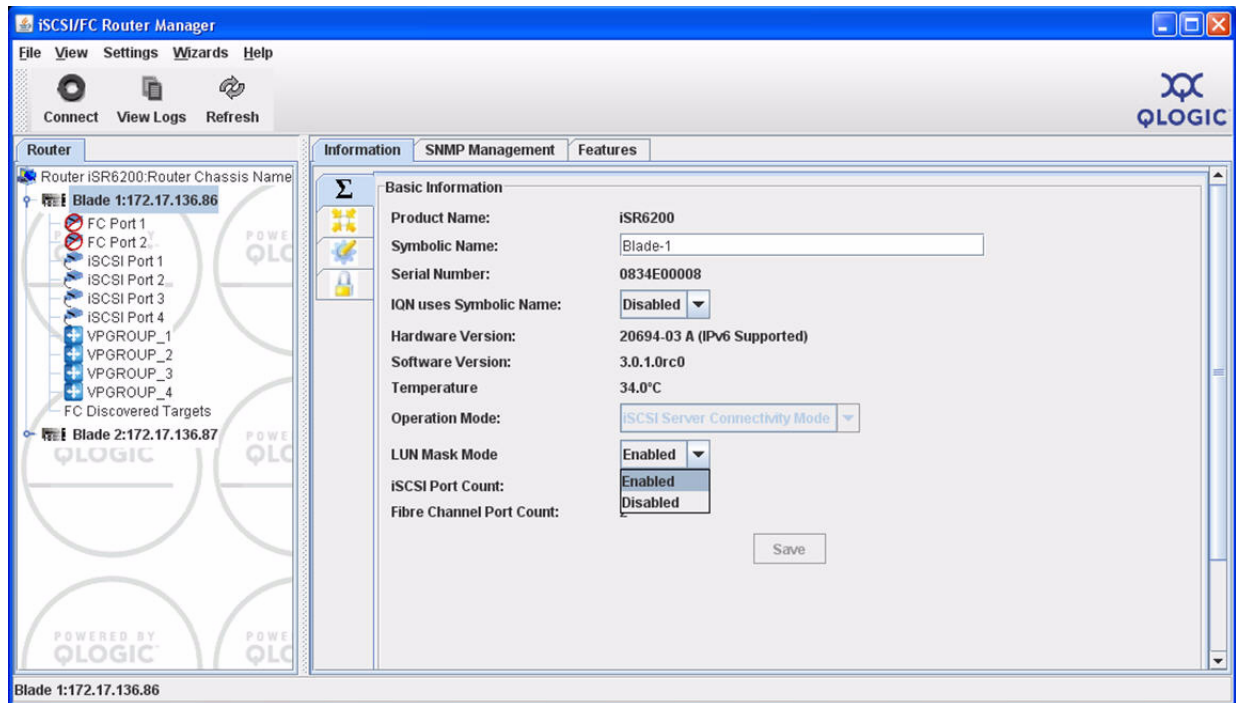


**Figure 4-21 Enabling LUN Mask Mode**

Figure 4-22 shows host LUN access with LUN Masking set to disabled.

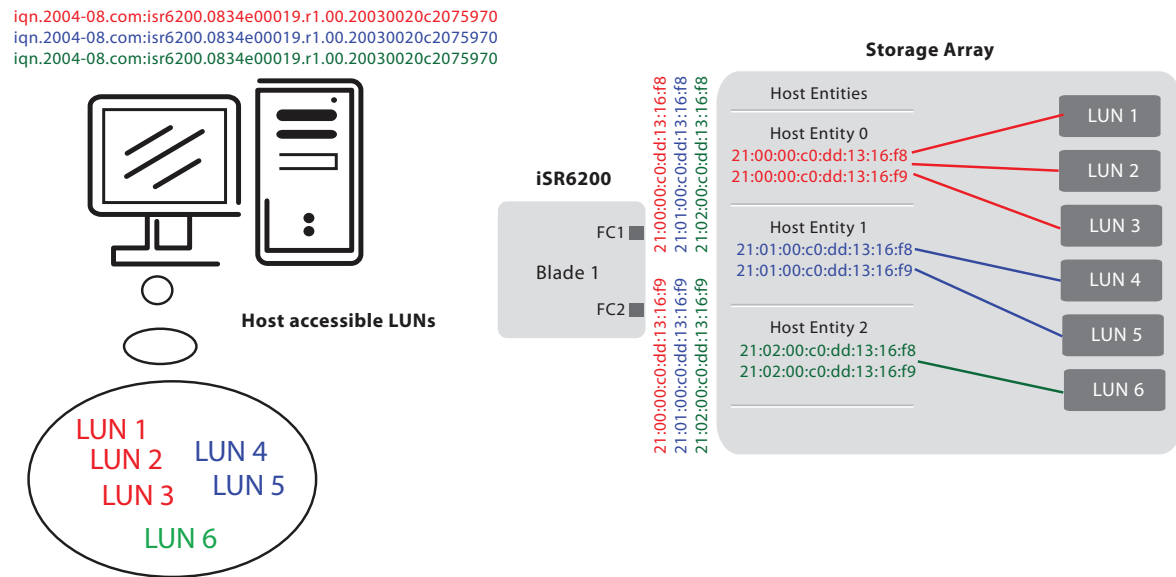


**Figure 4-22 Host LUN Access with LUN Masking Disabled**

**NOTE:**

The iSR6250 router can access LUNs only after the host logs into iSR6250 Presented iSCSI target(s).

---

## Notes

# 5 Diagnostics and Troubleshooting

Diagnostic information about the router is available through the chassis LEDs and the port LEDs. Diagnostic information is also available through the SANsurfer Router Manager and Command Line Interface (CLI) event logs and error displays. This section describes the following types of diagnostics:

- [Chassis Diagnostics](#)
- [Power-On Self-Test Diagnostics](#) (see [page 5-2](#))
- [LED Blink Patterns](#) (see [page 5-3](#))

This section also describes how to use maintenance mode to recover a disabled router (see [page 5-5](#)).

## Chassis Diagnostics

[Figure 5-1](#) shows the chassis diagnostic LEDs.

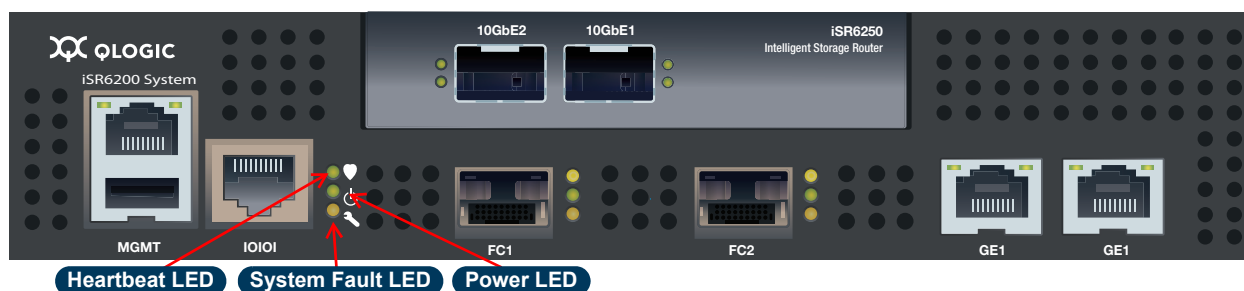


**Figure 5-1 Router Blade Diagnostic LEDs**

### Chassis Diagnostic LEDs

This section describes the following conditions:

- [Input Power LED is Off](#) (see [page 5-2](#))
- [System Fault LED is On](#) (see [page 5-2](#))

## Input Power LED is Off

The input power LED lights up to show that the router logic circuitry is receiving proper voltages. If the input power LED is off, do the following:

- Inspect power cord and connectors. Is the cord unplugged? Is the cord or connector damaged?
  - **Yes** – Make necessary corrections or repairs. If the condition remains, continue.
  - **No** – Continue.
- Inspect AC power source. Is the power source delivering the proper voltage?
  - **Yes** – Continue.
  - **No** – Make the necessary repairs. If the condition remains, continue.
- Replace the router.

## System Fault LED is On

The System fault LED will blink a specific pattern to indicate the problem. If the system fault LED lights up, take necessary actions (see [page 5-3](#)).

## Power-On Self-Test Diagnostics

The router performs a series of tests as part of its power-on procedure. The POST diagnostic program performs the following tests:

- Memory
- FLASH validation
- PCI device discovery
- Management Ethernet port

## LED Blink Patterns

The heartbeat and system fault LEDs show the operational status of the router. When the POST completes with no errors, these LEDs blink at a steady rate of once per second. When the router is in maintenance mode, the heartbeat and system fault LEDs are on continuously.

All other system fault blink patterns show critical errors. The heartbeat LED shows an error blink pattern for the conditions listed in [Table 5-1](#).

**Table 5-1. System Fault LED Blink Patterns**

System Fault LED	Condition
OFF	OK - Operational
3 Blinks, followed by pause	System error
4 Blinks, followed by pause	Management port IP address conflict
5 Blinks, followed by pause	Over temperature

### Heartbeat Blink Pattern

A blink pattern on the heartbeat LED of one second ON followed by one second OFF means that the router is operating normally. The heartbeat LED shows this pattern when the router firmware is operational.



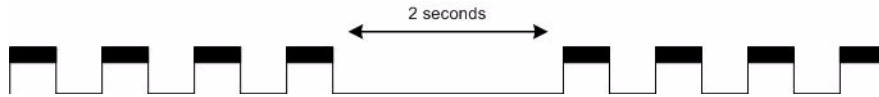
### System Error Blink Pattern

The system fault LED generates a three-blink pattern (once per second) followed by a two second pause to indicate a system error.



## Management Port IP Address Conflict Blink Pattern

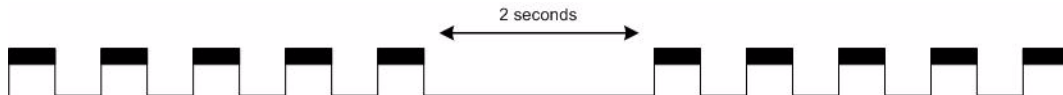
The system fault LED generates a four-blink pattern (once per second) followed by a two second pause when the router detects an IP address conflict on the management Ethernet port.



You can clear the IP address conflict blinking using the CLI or SANSurfer Router Manager. Use the beacon OFF function.

## Over-Temperature Blink Pattern

The system fault LED generates a five-blink pattern (once per second) followed by a two second pause when the router is in an over-temperature condition. That is, the air temperature inside the router is over the failure temperature of 70°C (158°F).



If the system fault LED shows the over temperature blink pattern, do the following:

- Inspect the chassis air vents. Are the intake and exhaust vents clear?
  - **Yes** – Continue
  - **No** – Remove any debris from the fan intake and exhaust if necessary. If the condition remains, continue.
- Consider the ambient air temperature near the router and clearance around the router. Make necessary corrections. If the condition remains, open a command line window and log on to the router. Enter the `shutdown` command, then power down the router. Contact your authorized maintenance provider.

## Recovering a Router

You may have to recover a router for one of the following reasons:

- The password was changed and has been forgotten.
- The router's management IP address is unknown.

To recover the router's password, reset the password to the default by using the maintenance button (see [page 1-7](#)).

You can recover the router's IP address using either of the following methods:

- Connect to the serial console port (see [page 1-12](#)), then use the CLI `set mgmt` command to reconfigure the management port (see the *iSR6200 CLI User's Guide*).
- Use the maintenance button to reset the management port's IP to the factory default of 10.0.0.1 (see [page 1-7](#)).

---

## Notes

# 6 Removal/Replacement

This section describes how to remove and replace the following field replaceable units (FRUs):

- [“SFP Transceivers” on page 6-1](#)
- [“iSR6250 Chassis Blades” on page 6-2](#)
- [“Power and Cooling Modules” on page 6-6](#)

## SFP Transceivers

You can remove and replace the SFP transceivers while the iSR6250 router is operating without damaging the router or the transceiver. However, this interrupts transmission on the affected port until you install the transceiver.

- To remove a transceiver, gently press the transceiver into the port to release the tension, then pull the release tab or lever and remove the transceiver. Different transceiver manufacturers have different release mechanisms. Consult the documentation for your transceiver.
- To install a transceiver, insert it into the port and gently press until it snaps in place.

**NOTE:**

The SFP transceiver fits only one way. If the SFP does not install under gentle pressure, flip it over and try again.

## iSR6250 Chassis Blades

The iSR6250 router provides an enhanced facility you can use to replace any blade in the field. When you replace a blade, it automatically restores all the configuration data from the other blade.

The following sections show how to remove and replace a failed blade in the iSR6250 dual-blade chassis:

- [“Removing the Failed Blade” on page 6-2](#)
- [“Installing a New Replacement Blade” on page 6-4](#)

### Removing the Failed Blade

To remove a failed blade from an iSR6250 chassis:

1. Log all iSCSI initiators out of the iSR6250 blade you are replacing prior to replacing the iSR6250 router blade.
2. Disconnect all cables from the iSR6250 blade you are replacing. This includes Fibre Channel, iSCSI, management, Ethernet, and serial cables.

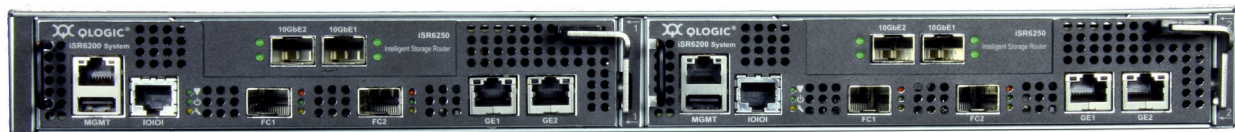


**Figure 6-1 iSR6250 Router Blade with Cables Disconnected**

3. Remove the old blade from the chassis. [Figure 6-2](#) shows how to release the latch and pull down on the lever on the right-hand side (1), then pull straight back on the handle (2).



**Figure 6-2 Removing the Chassis Blade**

## Installing a New Replacement Blade

Before replacing a blade for a dual-blade router installation, you must first remove it (as described on [page 6-2](#)).

**To install a replacement blade in an iSR6250 chassis with a dual blade:**

1. Unlatch the lever on the new blade prior to inserting it into the chassis, as shown in [Figure 6-3](#).

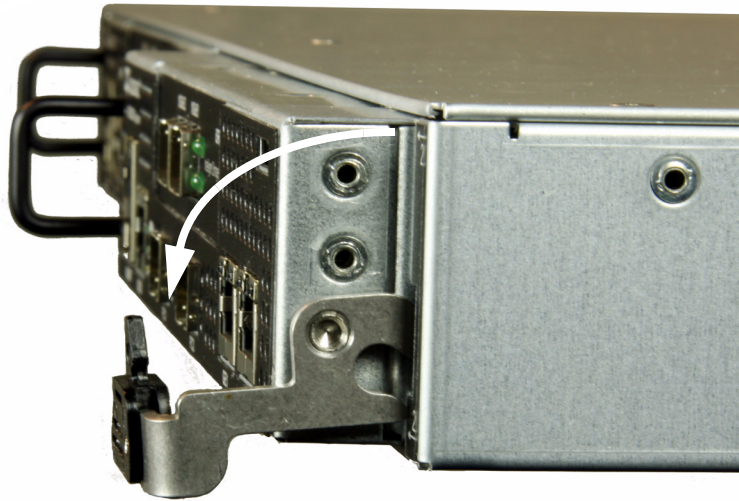


**Figure 6-3 Unlatching the Lever on the New Blade**

2. Insert the new blade into the chassis slot. [Figure 6-4](#) shows how to push the blade straight into the chassis (1), then seat the blade onto the chassis mid-plane by pushing the right side lever up and latching it into place (2). The blade will power on and boot up.

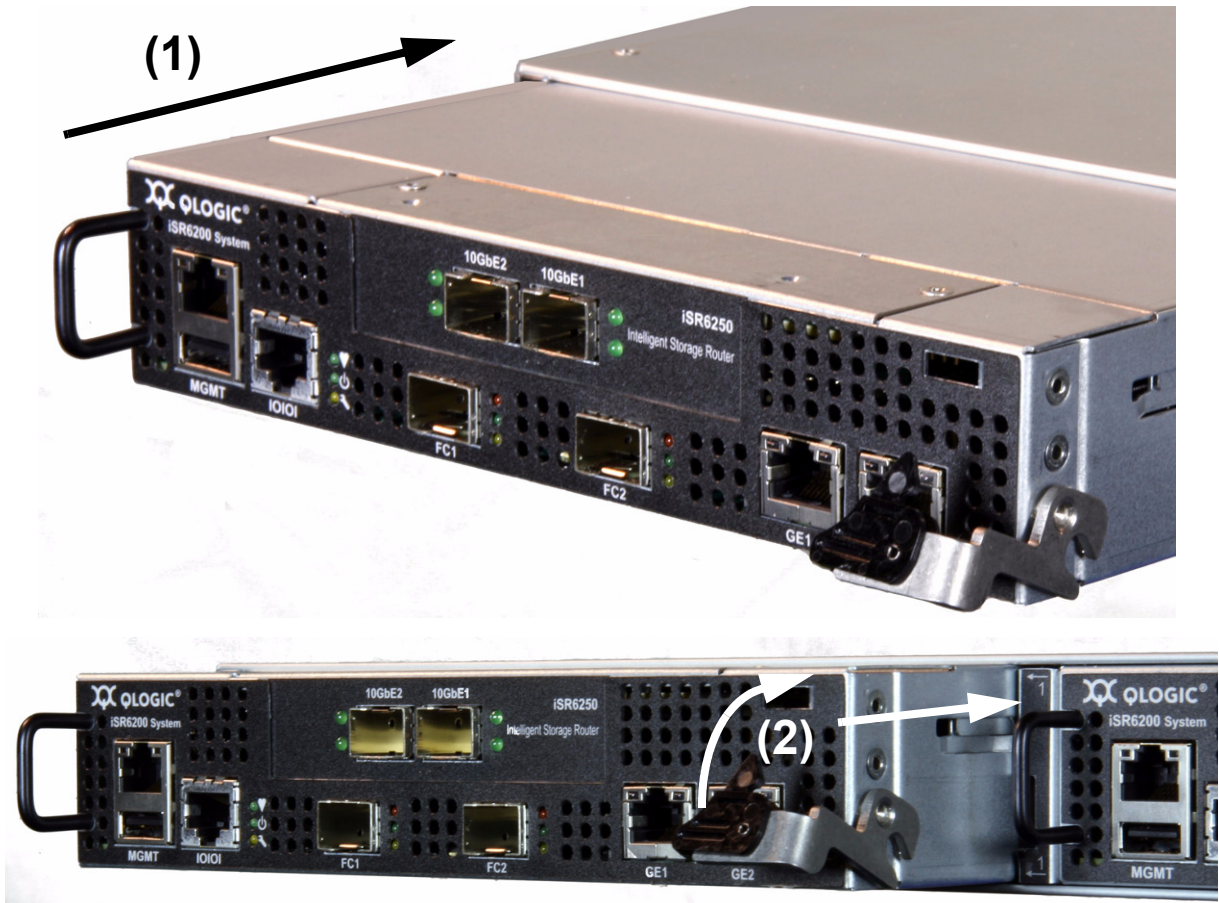


**Figure 6-4 Inserting the New Blade into the Chassis Slot**

3. Reconnect all cables to the new blade.

## Power and Cooling Modules

Each iSR6250 chassis blade has a power and cooling module (PCM), located on the back side of the chassis. Each PCM consists of one power supply, three fans, and one external status LED.

The PCM's external status LED shows its status:

- Green = GOOD status, indicating that the PCM is running as expected.
- Amber = FAULT status, indicating that the PCM has failed.

You can remove and replace a failed PCM as described in the following sections:

- [“Removing the Failed PCM” on page 6-6](#)
- [“Installing a New PCM” on page 6-8](#)

### Removing the Failed PCM

To remove a failed PCM from the iSR6250 chassis:

1. Locate the failed PCM unit on the back side of the iSR6250 chassis. A failed PCM unit displays an amber color status LED.

[Figure 6-5](#) shows the back side of two PCMs installed in a chassis configured with two iSR6250 chassis blades. The PCM on the left side displays its fault indicator in amber, which indicates a FAULT status. The PCM on the right side displays its fault indicator in green, which indicates a GOOD status.



**Figure 6-5 Back Side of Two PCMs with Fault (left) and Good (right) Status Indicators**

2. Check the second (GOOD) PCM to make sure it is ready to support storage connectivity while you're replacing the failed PCM unit. Make sure the second PCM's power cable is connected to the cable with the other end plugged into a live power source and that it displays a green status LED.

#### **CAUTION!**

Failure to verify the functionality of the second PCM can result in lost host storage connectivity.

3. Remove the power cable from the failed PCM unit. The LED will remain amber even after the removing the power cable.
4. Release the chassis latch on the left side of the unplugged PCM. As shown in [Figure 6-6](#), pull down on the lever to unseat the PCM (1), then remove the PCM by pulling straight back on the handle (2).

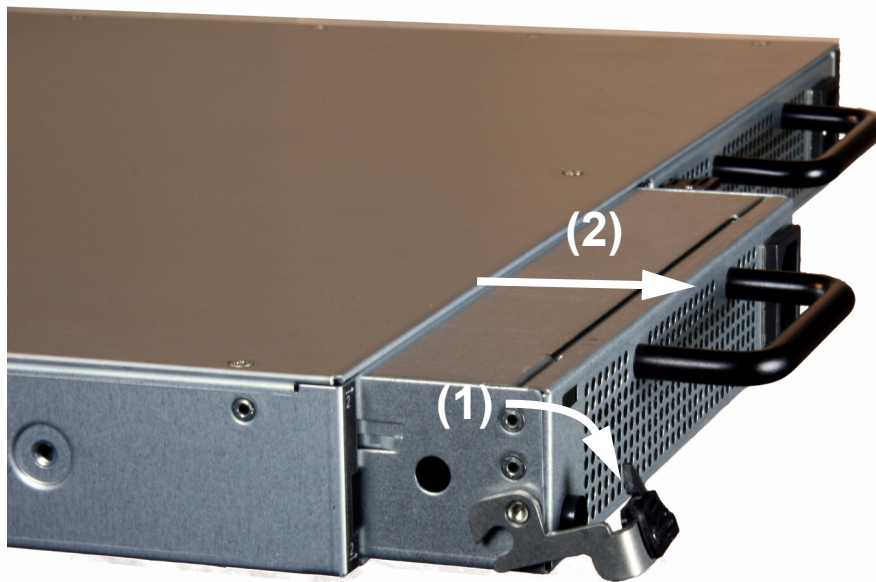


**Figure 6-6 Removing the Failed PCM**

## Installing a New PCM

To install a replacement PCM in the iSR6250 chassis:

1. Before you insert the new PCM into the chassis, unlatch the lever on the new PCM (see [Figure 6-7](#).)

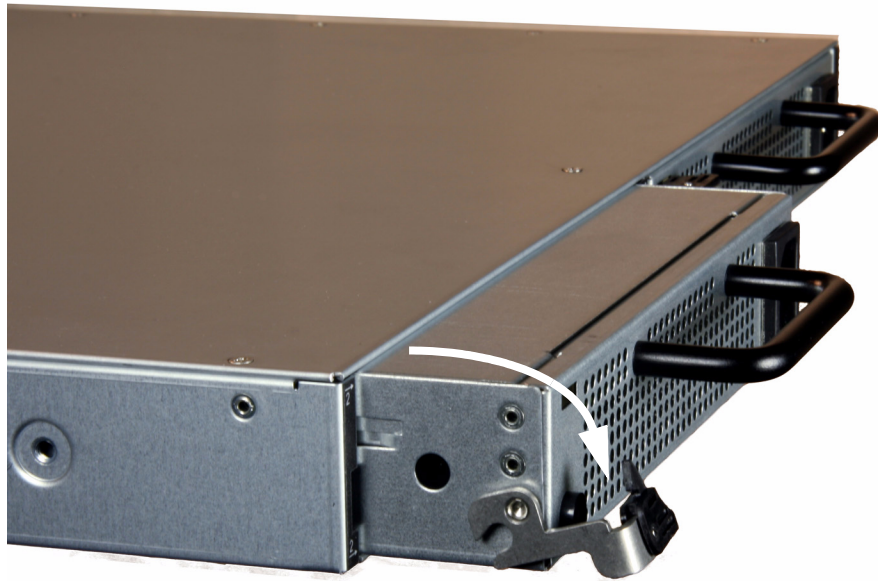


**Figure 6-7 Unlatching Lever on New PCM**

2. Insert the replacement PCM into the iSR6250 chassis. As shown in [Figure 6-6](#), push the PCM straight into the chassis (1) and make sure the PCM is properly seated into the chassis mid-plane by pushing the lever up and locking the latch in the up position (2). The PCM fans will turn on and the LED should show an amber status.

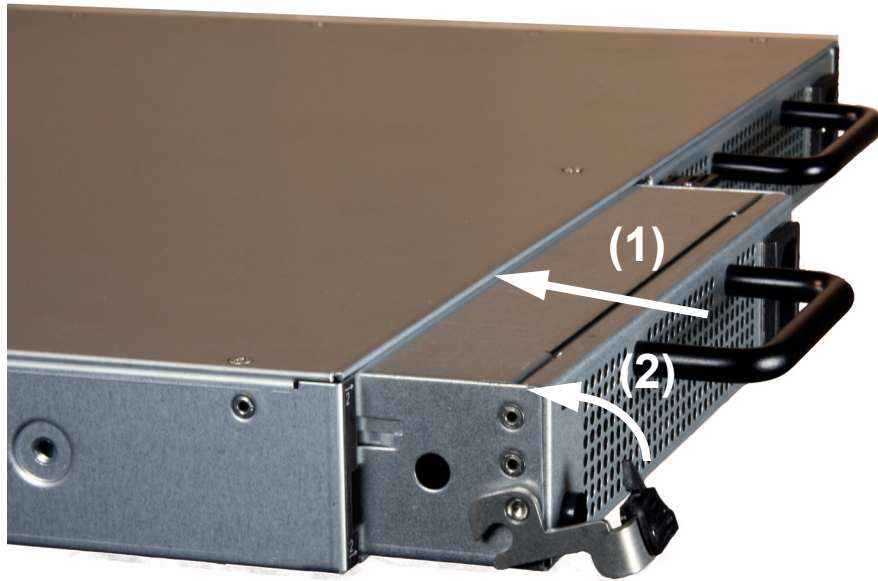


**Figure 6-8 Inserting the Replacement PCM**

3. Connect the power cable to the newly inserted PCM. Its status LED should change from amber to green within 5 seconds.



**Figure 6-9 Back Side of Two PCMs - Both with Good Status Indicators**

4. Verify that the airflow through both PCMs is in the same direction.

---

## Notes

# A Technical Specifications

This appendix provides technical specification for the iSR6250 router. This includes:

[“Interface Specifications” on page A-1](#)

[“Performance Features” on page A-2](#)

[“iSCSI Initiator Support” on page A-3](#)

[“Device Management” on page A-3](#)

[“Mechanical” on page A-3](#)

[“High Availability” on page A-4](#)

[“Protocols” on page A-4](#)

[“Environmental/Safety” on page A-5](#)

## Interface Specifications

The iSR6250 router chassis contains two blades. The following interfaces apply to each router blade.

- **10Gb Ethernet**
  - Two ports: 10GBase optical
  - Full duplex, SR/SW 10G Ethernet, 850nm
- **Gigabit Ethernet**
  - Two ports: copper 1000 BaseT, RJ45
  - Full duplex, auto negotiating 100/1000 Mbps
- **Fibre Channel**
  - Two optical ports, full duplex
  - Auto negotiation: 8/4/2 Gbps
  - N\_ports, NL\_ports, F\_ports, FL\_ports
  - Class 2, 3 connection-less

- **Management Ports**
  - Ethernet 10/100 BaseT with RJ45
  - RS-232 serial port with RJ45
- **Expansion slot with 2 x 10Gb Ethernet FCoE/iSCSI ports**

## Performance Features

- **Maximum Data Rates**
  - iSCSI: 2.6-Gbps aggregate (1.3 Gb per blade)
  - FC: 12.8-Gbps aggregate (6.4Gb per blade)
- **Input/output Operations per Second (IOPS)**
  - 200K IOPS aggregate (100K per blade)
- **VLAN Support**
  - Up to 2 VLANs per GbE port (one for IPv4 and one for IPv6)
- **iSCSI Host Support**
  - 2,048 iSCSI Hosts (1,024 per router blade)
- **WAN Device Support**
  - 252 WWNNs (63 per FC port)
  - Simultaneous target and initiator mode for FC ports
- **Supported SFP Types**
  - Shortwave (optical)
  - Longwave (optical)
- **Interoperability**
  - Compatible with FC-SW-2 complaint switches
  - Management interoperability with leading SAN management applications

## iSCSI Initiator Support

- Microsoft: Windows 2000/2003/2008
- Solaris: SPARC 2.6, 8, 9, 10; X86
- Linux: Red Hat AS 3, 4, 5; SuSE Enterprise Server 8, 9, 10
- VMware: ESX Server v3.0.x, v3.5x
- AIX: AIXL 5
- HP-UX: versions 9, 10
- QLogic: 4010, 4050, 4052, 4060, 4062
- Apple: OS-X (via ATTO driver)

## Device Management

- **Management Methods**
  - Wizard-based configuration tools
  - Command line interface (CLI)
  - SNMP and SMI-S\*
- **Access Methods**
  - Dedicated out-of-band Ethernet 10/100BaseT, RJ45 and RS-232 serial port
- **Diagnostics**
  - Power-on self-test (POST) of all functions except media modules
- **User Interface**
  - LED front panel indicators, CLI, and browser utilities

## Mechanical

- **Enclosure Type**
  - 1U, full rack width, mounting rails included
- **Dimensions**
  - Width: 431.8mm (17.00")
  - Height: 44.5mm (1.75")
  - Depth: 631.4mm (24.9")
  - Weight: 12.7 kg (27.9 lbs)

- **Power Supply**
  - 235W maximum (2 blades and 2 expansion cards)
  - 106W typical (1 Blade, 2 power modules)
  - 100 VAC to 240 VAC; 50 Hz to 60 Hz
  - 1.9A at 100–125 VAC; 1.02A at 200-240VAC
  - Dual, redundant, hot-swap power supplies
- **Cooling**
  - Six redundant fans with back-to-front airflow
- **Included Accessories**
  - 8Gb FC SFP (4)
  - 10GbE SFP+, SW 850nm (4)
  - Power cords, North America (2)
  - Slide rail kit (1)
  - RJ45 to RS-232 dongle (1)

## High Availability

- Hot-swap router blades and power supplies
- Router blade persistence: all zoning and addressing maintained in non-volatile memory.
- Fan modules powered by both power supplies.

## Protocols

- iSCSI to FCP
- FCIP
- CHAP security and authentication
- IPv6 and IPv4

## Environmental/Safety

### ■ Operating

- Temperature: +5°C to +40°C (41°F to 104°F)
- Humidity: 5% to 90% non-condensing
- Altitude: 0 to +10,000 ft.
- Vibration: IEC 68-2, 5-500Hz, random, 0.21G rms, 10 minutes
- Shock: IEC 68-2, 4g, 11ms, 20 repetitions

### ■ Non-operating

- Temperature: -40°C to +70°C (-40°F to 158°F)
- Humidity: 5% to 93% non-condensing
- Altitude: 0 to +50,000 ft.
- Vibration: IEC 68-2, 5-500Hz, random, 2.09G rms, 10 minutes
- Shock: IEC 68-3, 30g, 292 ips, 3 repetitions, 3 axis

---

## Notes

# **B** Simple Network Management Protocol

*Simple network management protocol* (SNMP) provides monitoring and trap functions for managing the router through third-party applications that support SNMP. The router firmware supports SNMP versions 1 and 2 and a QLogic management information base (MIB) (see [page B-4](#)). You may format traps using SNMP version 1 or 2.

This appendix provides the following SNMP information for the ProductName:

- [“SNMP Parameters” on page B-2](#)
- [“SNMP Trap Configuration” on page B-3](#)
- [“Management Information Base \(MIB\)” on page B-4](#)
- [“Notifications” on page B-19](#)

## SNMP Parameters

You can set the SNMP properties using the SANsurfer Router Manager or the command line interface (CLI). For SNMP configuration details, see the *iSR6200 Router CLI User's Guide* or the *iSR6200 Router Manager User's Guide*.

Table B-1 describes the SNMP parameters.

**Table B-1. SNMP Parameters**

Parameter	Description
Read community	A password that authorizes an SNMP management server to read information from the router. This is a write-only field. The value on the router and the SNMP management server must be the same. The read community password can be up to 32 characters, excluding the number sign (#), semicolon (;), and comma (,). The default password is <i>private</i> .
Trap community	A password that authorizes an SNMP management server to receive traps. This is a write-only field. The value on the router and the SNMP management server must be the same. The trap community password can be up to 32 characters, excluding the number sign (#), semicolon (;), and comma (,). The default password is <i>private</i> .
System location	Specifies the name of the router location. The name can be up to 64 characters, excluding the number sign (#), semicolon (;), and comma (,). The default is undefined.
System contact	Specifies the name of the person to be contacted to respond to trap events. The name can be up to 64 characters, excluding the number sign (#), semicolon (;), and comma (,). The default is undefined.
Authentication traps	Enables or disables the generation of authentication traps in response to authentication failures. The default is <i>disabled</i> .

## SNMP Trap Configuration

SNMP trap configuration lets you set up to eight trap destinations. Choose from Traps 1–Trap 8 to configure each trap. [Table B-2](#) describes the parameters for configuring an SNMP trap.

**Table B-2. SNMP Trap Configuration Parameters**

Parameter	Description
Trap <i>n</i> enabled	Enables or disables trap <i>n</i> . If disabled, the trap is not configured.
Trap address*	Specifies the IP address to which the SNMP traps are sent. A maximum of eight trap addresses are supported. The default address for traps is 0.0.0.0.
Trap port*	Port number on which the trap is sent. The default is 162. If the trap destination is not enabled, then this value is 0 (zero). Most SNMP managers and management software listen on this port for SNMP traps.
Trap version	Specifies the SNMP version (1 or 2) with which to format traps.

**Table Note**

\* Trap address (other than 0.0.0.0.) and trap port combinations must be unique. For example, if trap 1 and trap 2 have the same address, then they must have different port values. Similarly, if trap 1 and trap 2 have the same port value, they must have different addresses.

## Management Information Base (MIB)

This section describes the QLogic management information base (MIB). The MIB includes the following tables:

- “Network Port Table” on page B-4
- “FC Port Table” on page B-7
- “Initiator Object Table” on page B-9
- “LUN Table” on page B-12
- “VP Group Table” on page B-14
- “Sensor Table” on page B-16

### Network Port Table

The network port table contains a list of network ports that are operational on the router. The entries in this table include the management port (labeled MGMT), and the Gigabit Ethernet ports (labeled GE1 and GE2). For details, see the *iSR6200 Router Installation Guide*.

#### qsrNwPortTable

<b>Syntax</b>	SEQUENCE OF QsrNwPortEntry
<b>Access</b>	Not accessible
<b>Description</b>	Entries in this table include the management port, and the iSCSI ports on the router.

#### qsrNwPortEntry

<b>Syntax</b>	QsrNwPortEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry (row) contains information about a specific network port.

A network port entry consists of the following sequence of objects:

qsrNwPortRole	QsrPortRole
qsrNwPortIndex	unsigned32
qsrNwPortAddressMode	INTEGER
qsrIPAddressType	InetAddressType
qsrIPAddress	InetAddress
qsrNetMask	InetAddress
qsrGateway	InetAddress
qsrMacAddress	MacAddress
qsrNwLinkStatus	QsrLinkStatus
qsrNwLinkRate	QsrLinkRate

#### qsrNwPortRole

<b>Syntax</b>	QsrPortRole
<b>Access</b>	Not accessible
<b>Description</b>	Operational role of this port: management port or iSCSI port.

#### qsrNwPortIndex

<b>Syntax</b>	Unsigned32
<b>Access</b>	Not accessible
<b>Description</b>	A positive integer indexing each network port in a given role.

#### qsrNwPortAddressMode

<b>Syntax</b>	INTEGER 1 = Static 2 = DHCP 3 = Bootp 4 = RARP
<b>Access</b>	Read-only
<b>Description</b>	Method by which the port gets its IP address.

### **qsrlIPAddressType**

<b>Syntax</b>	<code>InetAddressType</code>
<b>Access</b>	Read-only
<b>Description</b>	IP address type: <code>ipv4</code> or <code>ipv6</code> .

### **qsrlIPAddress**

<b>Syntax</b>	<code>InetAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	IP address of the port.

### **qsrlNetMask**

<b>Syntax</b>	<code>InetAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	Subnet mask for this port.

### **qsrlGateway**

<b>Syntax</b>	<code>InetAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	Gateway for this port.

### **qsrlMacAddress**

<b>Syntax</b>	<code>IMacAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	MAC address for this port.

### **qstNwLinkStatus**

<b>Syntax</b>	<code>QsrLinkStatus</code>
<b>Access</b>	Read-only
<b>Description</b>	Operational link status for this port.

### qsrNwLinkRate

<b>Syntax</b>	QsrLinkRate
<b>Access</b>	Read-only
<b>Description</b>	Operational link rate for this port.

## FC Port Table

This table contains a list of the Fibre Channel (FC) ports on the router. There are as many entries in this table as there are FC ports on the router.

### qsrFcPortTable

<b>Syntax</b>	SEQUENCE OF QsrFcPortEntry
<b>Access</b>	Not accessible
<b>Description</b>	A list of the FC ports on the router. The table contains as many entries as there are FC ports on the router.

### qsrFcPortEntry

<b>Syntax</b>	QsrFcPortEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry (row) contains information about a specific FC port.

An FC port entry consists of the following sequence of objects

qsrFcPortRole	QsrPortRole
qsrFcPortIndex	Unsigned32
qsrFcPortNodeWwn	PhysAddress
qsrFcPortWwn	PhysAddress
qsrFcPortId	PhysAddress
qsrFcPortType	Unsigned32
qsrFcLinkStatus	QsrLinkStatus
qsrFcLinkRate	QsrLinkRate

#### qsrFcPortRole

<b>Syntax</b>	QsrPortRole
<b>Access</b>	Not accessible
<b>Description</b>	Operational role of this port: FCP mode or frame shuttle mode.

#### qsrFcPortIndex

<b>Syntax</b>	Unsigned32
<b>Access</b>	Not accessible
<b>Description</b>	A positive integer indexing each FC port in a given role.

#### qsrFcPortNodeWwn

<b>Syntax</b>	PhysAddress
<b>Access</b>	Read-only
<b>Description</b>	World wide name of the node that contains this port.

#### qsrFcPortWwn

<b>Syntax</b>	PhysAddress
<b>Access</b>	Read-only
<b>Description</b>	World wide name for this port.

#### qsrFcPortId

<b>Syntax</b>	PhysAddress
<b>Access</b>	Read-only
<b>Description</b>	Interface's 24-bit FC address identifier.

**qsrFcPortType**

<b>Syntax</b>	Unsigned32
<b>Access</b>	Read-only
<b>Description</b>	Type of FC port, as indicated by the use of the appropriate value assigned by IANA. The IANA-maintained registry for FC port types is located here:  <a href="http://www.iana.org/assignments/fc-port-types">www.iana.org/assignments/fc-port-types</a>

**qsrFcLinkStatus**

<b>Syntax</b>	QsrLinkStatus
<b>Access</b>	Read-only
<b>Description</b>	Current link status for this port.

**qsrFcLinkRate**

<b>Syntax</b>	QsrLinkRate
<b>Access</b>	Read-only
<b>Description</b>	Current link rate for this port.

## Initiator Object Table

The initiator object table is a list of the iSCSI initiators that have been discovered by the router. There are as many entries in this table as there are iSCSI initiators on the router.

**qsrlsInitTable**

<b>Syntax</b>	SEQUENCE OF QsrIsInitEntry
<b>Access</b>	Not accessible
<b>Description</b>	Entries in this table contain Information about initiators.

### qsrlsInitEntry

<b>Syntax</b>	QsrIsInitEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry (row) contains information about a specific iSCSI initiator.

iSCSI initiator information entry consists of the following sequence of the object:

qsrlsInitIndex	Unsigned32,
qsrlsInitName	SnmpAdminString,
qsrlsInitAlias	SnmpAdminString,
qsrlsInitAddressType	InetAddressType,
qsrlsInitAddress	InetAddress,
qsrlsInitStatus	INTEGER,
qsrlsInitOsType	SnmpAdminString,
qsrlsInitChapEnabled	INTEGER

### qsrlsInitIndex

<b>Syntax</b>	Unsigned32
<b>Access</b>	Not accessible
<b>Description</b>	An arbitrary positive integer denoting each iSCSI initiator discovered by the router.

### qsrlsInitName OBJECT-TYPE

<b>Syntax</b>	SnmpAdminString
<b>Access</b>	Not accessible
<b>Description</b>	iSCSI name of the initiator.

### qsrlsInitAlias OBJECT-TYPE

<b>Syntax</b>	SnmpAdminString
<b>Access</b>	Read-only
<b>Description</b>	Alias for the iSCSI initiator.

**qsrlsInitAddressType**

<b>Syntax</b>	<code>InetAddressType</code>
<b>Access</b>	Read-only
<b>Description</b>	Type of iSCSI initiator's IP address (IPv4 or IPv6).

**qsrlsInitAddress**

<b>Syntax</b>	<code>InetAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	IP address of the iSCSI initiator.

**qsrlsInitStatus**

<b>Syntax</b>	<code>Integer:</code> 1 = unknown, 2 = loggedIn, 3 = loggedOut, 4 = recovery
<b>Access</b>	Read-only
<b>Description</b>	Status of the iSCSI initiator, that is, whether or not it is logged in to the router.

**qsrlsInitOsType**

<b>Syntax</b>	<code>SnmpAdminString</code>
<b>Access</b>	Read-only
<b>Description</b>	The type of the iSCSI initiator's operating system.

**qsrlsInitChapEnabled**

<b>Syntax</b>	<code>Integer:</code> 0 = enabled; 2 = disabled
<b>Access</b>	Read-only
<b>Description</b>	A value indicating whether CHAP is enabled or not for this iSCSI initiator.

## LUN Table

These tables contains information about the logical unit number (LUN) list.

### qsrLunTable

<b>Syntax</b>	SEQUENCE OF QsrLunEntry
<b>Access</b>	Not accessible
<b>Description</b>	A list of the LUNs on the FC targets discovered by the router. There are as many entries in this table as there are FC targets on the router.

### qsrLunEntry

<b>Syntax</b>	QsrLunEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry (row) contains information about a specific LUN. This table extends <code>scsiDscLunTable</code> in <code>QLOGIC-SCSI-MIB</code> . The entries in this table show other attributes of the LUN.

The `QsrLunEntry` contains of following sequences of objects.

<code>qsrLunWwuln</code>	<code>PhysAddress</code> ,
<code>qsrLunVendorId</code>	<code>SnmpAdminString</code> ,
<code>qsrLunProductId</code>	<code>SnmpAdminString</code> ,
<code>qsrLunProdRevLevel</code>	<code>SnmpAdminString</code> ,
<code>qsrLunSize</code>	<code>Unsigned32</code> ,
<code>qsrLunState</code>	<code>INTEGER</code> ,
<code>qsrLunVPGroupid</code>	<code>INTEGER</code> ,
<code>qsrLunVPGroupname</code>	<code>SnmpAdminString</code>

### qsrLunWwuln

<b>Syntax</b>	<code>PhysAddress</code>
<b>Access</b>	Read-only
<b>Description</b>	The worldwide unique LUN name (WWULN) for the LUN.

**qsrLunVendorId****Syntax**     `SnmpAdminString`**Access**     Read-only**Description**     Vendor ID for the LUN.**qsrLunProductId****Syntax**     `SnmpAdminString`**Access**     Read-only**Description**     Product ID for the LUN.**qsrLunProdRevLevel****Syntax**     `SnmpAdminString`**Access**     Read-only**Description**     Product revision level for the LUN.**qsrLunSize OBJECT-TYPE****Syntax**     `Unsigned32`**Units**     Megabytes**Access**     Read-only**Description**     Size of the LUN (in megabytes).**qsrLunState****Syntax**     `Integer`  
              1 = online,  
              2 = offline,  
              3 = reserved**Access**     Read-only**Description**     State of the LUN (online or offline).

### **qsrLunVPGroupid**

<b>Syntax</b>	Integer
<b>Access</b>	Read-only
<b>Description</b>	ID of the VP group to which this LUN belongs.

### **qsrLunVPGroupname OBJECT-TYPE**

<b>Syntax</b>	SnmpAdminString
<b>Access</b>	Read-only
<b>Description</b>	VP group name to which this LUN belongs.

## **VP Group Table**

This table contains a list of virtual port groups (VPGs). There are four entries in this table at any point of time.

### **qsrVPGroupTable**

<b>Syntax</b>	SEQUENCE OF QsrVPGroupEntry
<b>Access</b>	Not accessible
<b>Description</b>	Table for the VP group.

### **qsrVPGroupEntry OBJECT-TYPE**

<b>Syntax</b>	QsrVPGroupEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry in the VP group table.
<b>Index</b>	{ qsrVPGroupIndex } ::= { qsrVPGroupTable 1 }

The **QsrVPGroupEntry** contains the following sequence of objects:

qsrVPGroupIndex	Unsigned32,
qsrVPGroupId	INTEGER,
qsrVPGroupName	SnmpAdminString,
qsrVPGroupWWNN	VpGroupWwnnAndWwpn,
qsrVPGroupWWPN	VpGroupWwnnAndWwpn,
qsrVPGroupStatus	INTEGER

#### **qsrVPGroupIndex OBJECT-TYPE**

<b>Syntax</b>	Unsigned32
<b>Access</b>	Read-only
<b>Description</b>	VP group index.

#### **qsrVPGroupId OBJECT-TYPE**

<b>Syntax</b>	Integer
<b>Access</b>	Read-only
<b>Description</b>	VP group ID.

#### **qsrVPGroupName**

<b>Syntax</b>	SnmpAdminString
<b>Access</b>	Read-only
<b>Description</b>	VP group name or host group name.

#### **qsrVPGroupWWNN**

<b>Syntax</b>	VpGroupWwnnAndWwpn
<b>Access</b>	Read-only
<b>Description</b>	Worldwide node name (WWNN) for VP group.

#### **qsrVPGroupWWPN OBJECT-TYPE**

<b>Syntax</b>	VpGroupWwnnAndWwpn
<b>Access</b>	Read-only
<b>Description</b>	Worldwide port number (WWPN).

#### **qsrVPGroupStatus OBJECT-TYPE**

<b>Syntax</b>	Integer: 0 = enabled; 1 = disabled
<b>Max-Access</b>	Read-only
<b>Description</b>	Maintain the status of the VP group (enabled/disabled)

## **Sensor Table**

The sensor table lists all the sensors on the router. Each table row specifies a single sensor.

#### **qsrSensorTable**

<b>Syntax</b>	SEQUENCE OF QsrSensorEntry
<b>Access</b>	Not accessible
<b>Description</b>	List of all the sensors on the router. The table contains as many entries (rows) as there are sensors.

#### **qsrSensorEntry**

<b>Syntax</b>	QsrSensorEntry
<b>Access</b>	Not accessible
<b>Description</b>	Each entry (row) corresponds to a single sensor.

A sensor entry consists of the following sequence of objects:

qsrSensorType	INTEGER
qsrSensorIndex	Unsigned32
qsrSensorUnits	INTEGER
qsrSensorValue	Integer32
qsrUpperThreshold	Integer32
qsrLowerThreshold	Integer32
qsrSensorState	INTEGER

#### **qsrSensorType**

<b>Syntax</b>	INTEGER Temperature = 1
<b>Access</b>	Not accessible
<b>Description</b>	Type of data being measured by this sensor.

#### **qsrSensorIndex**

<b>Syntax</b>	Unsigned32
<b>Access</b>	Not accessible
<b>Description</b>	A positive integer identifying each sensor of a given type.

#### **qsrSensorUnits**

<b>Syntax</b>	INTEGER Celsius = 1
<b>Access</b>	Read-only
<b>Description</b>	Unit of measurement for the sensor.

#### **qsrSensorValue**

<b>Syntax</b>	<code>Integer32</code>
<b>Access</b>	Read-only
<b>Description</b>	Current value of the sensor.

#### **qsrUpperThreshold**

<b>Syntax</b>	<code>Integer32</code>
<b>Access</b>	Read-only
<b>Description</b>	Upper-level threshold for this sensor.

#### **qsrLowerThreshold**

<b>Syntax</b>	<code>Integer32</code>
<b>Access</b>	Read-only
<b>Description</b>	Lower-level threshold for this sensor.

#### **qsrSensorState**

<b>Syntax</b>	<code>INTEGER</code>
<b>Access</b>	Read-only
<b>Description</b>	State of this sensor, indicating the health of the system: <code>Unknown</code> = The sensor value/thresholds cannot be determined. <code>Normal</code> = The sensor value is within normal operational limits. <code>Warning</code> = The sensor value is approaching a threshold. <code>Critical</code> = The sensor value has crossed a threshold.

## Notifications

The router provides the following notification types described in this section:

- “System Information Objects” on page B-19
- “Notification Objects” on page B-20
- “Agent Startup Notification” on page B-21)
- “Agent Shutdown Notification” on page B-21
- “Network Port Down Notification” on page B-21
- “FC Port Down Notification” on page B-22
- “Target Device Discovery” on page B-22
- “Target Presentation (Mapping)” on page B-22
- “VP Group Notification” on page B-23
- “Sensor Notification” on page B-23
- “Generic Notification” on page B-24

### NOTE:

Every notification uses `qsrBladeSlot` as one of the objects. This determines the originator blade for the same notification.

## System Information Objects

The system information objects provide the system serial number, version numbers (hardware/software/agent), and number of ports (FC/GE).

### qsrSerialNumber

<b>Syntax</b>	<code>SnmpAdminString</code>
<b>Access</b>	Read-only
<b>Description</b>	System serial number.

### qsrHwVersion

<b>Syntax</b>	<code>SnmpAdminString</code>
<b>Access</b>	Read-only
<b>Description</b>	System hardware version number.

#### **qsrSwVersion**

<b>Syntax</b>	<code>SnmpAdminString</code>
<b>Access</b>	Read-only
<b>Description</b>	System software (firmware) version number.

#### **qsrNoOfFcPorts**

<b>Syntax</b>	<code>Unsigned32</code>
<b>Access</b>	Read-only
<b>Description</b>	Quantity of FC ports on the system.

#### **qsrNoOfGbEPorts**

<b>Syntax</b>	<code>Unsigned32</code>
<b>Access</b>	Read-only
<b>Description</b>	Quantity of gigabit Ethernet ports on the system.

#### **qsrAgentVersion**

<b>Syntax</b>	<code>SnmpAdminString</code>
<b>Access</b>	Read-only
<b>Description</b>	Version number of the agent software on the system.

## **Notification Objects**

This section defines the objects used in notifications.

#### **qsrEventSeverity**

<b>Syntax</b>	<code>INTEGER</code>
<b>Access</b>	Accessible for notify
<b>Description</b>	Indicates the severity of the event. The value <i>clear</i> specifies that a condition that caused an earlier trap is no longer present.

### qsrEventDescription

**Syntax** `SnmpAdminString`

**Access** Accessible for notify

**Description** A textual description of the event that occurred.

### qsrEventTimeStamp

**Syntax** `DateAndTime`

**Access** Accessible for notify

**Description** Indicates when the event occurred.

## Agent Startup Notification

The agent startup notification indicates that the agent on the router has started running.

**qsrAgentStartup** uses the following object:

- `qsrEventTimeStamp`

## Agent Shutdown Notification

The agent shutdown notification indicates that the agent on the router is shutting down.

**qsrAgentShutdown** uses the following object:

- `qsrEventTimeStamp`

## Network Port Down Notification

The network port down notification indicates that the specified network port is **down**. The next time the port comes up, this event is sent with the `qsrEventSeverity` object set to **clear**.

**qsrNwPortDown** uses the following objects:

- `qsrNwLinkStatus`
- `qsrEventTimeStamp`
- `qsrEventSeverity`

Network notifications are sent for the following events:

- Management port: down or up
- iSCSI port: down or up
- Port number (1–4)

## FC Port Down Notification

The FC port down notification indicates that the specified FC port is down. The next time the port comes up, this event is sent with the `qsrEventSeverity` object set to `clear`.

**qsrFcPortDown** uses the following objects:

- `qsrFcLinkStatus`
- `qsrEventTimeStamp`
- `qsrEventSeverity`

FC notifications are sent for the following events:

- Fibre Channel port: down or up
- Port number (1–4)

## Target Device Discovery

The Fibre Channel target device discovery notification indicates that the specified Fibre Channel target is online or offline.

**qsrDscTgtStatusChanged** uses the following objects:

- `qsrBladeSlot`
- `qsrEventTimeStamp`
- `qsrFcTgtState`
- `qsrEventSeverity`

FC target device discovery notifications are sent for the following event:

- FC Target
  - ☐ State: Discovered, went offline, or went online
  - ☐ Target WWPN
  - ☐ Blade number (1 or 2)

## Target Presentation (Mapping)

The target presentation notification indicates that the specified target has been presented (mapped) or unpresented (unmapped).

**qsrPresTgtMapped** uses the following objects:

- `qsrBladeSlot`
- `qsrEventTimeStamp`
- `qsrPresTgtMapped`
- `qsrPresTgtUnmapped`
- `qsrEventSeverity`

Target presentation notifications are sent for the following event:

- Target Presentation

- ☐ State: Presented (mapped) or unpresented (unmapped)
- ☐ Target name
- ☐ Blade number (1 or 2)

## VP Group Notification

The VP group notification indicates that the specified VP group is enabled or disabled. It also represents change in the name of the VP group.

**qsrVPGroupStatusChanged** uses the following objects:

- `qsrBladeSlot`
- `qsrVPGroupIndex`
- `qsrVPGroupStatus`
- `qsrEventTimeStamp`
- `qsrEventSeverity`

VP group notifications are sent for the following events:

- Change in name of a VP group
- Enabling and disabling a VP group

## Sensor Notification

The sensor notification indicates that the state for the specified sensor is not `normal`. When the sensor returns to the normal state, this event is sent with the `qsrEventSeverity` object set to `clear`.

**qsrSensorNotification** uses the following objects:

- `qsrSensorValue`
- `qsrSensorState`
- `qsrEventTimeStamp`
- `qsrEventSeverity`

Sensor notifications are sent for the following events:

- Over Temperature
  - ☐ Blade number (1 or 2)
  - ☐ Sensor number (1 of 3)
- Temperature returned to normal
  - ☐ Blade number (1 or 2)
  - ☐ Sensor number (1 of 3)
- Fans at high speed
  - ☐ PCM number (1 or 2)
- Fans returned to normal speed
  - ☐ PCM number (1 or 2)

- Power Cooling Module (PCM) installed
  - PCM number (1 or 2)
- PCM removed
  - PCM number (1 or 2)
- PCM powered (AC power connected)
  - PCM number (1 or 2)
- PCM un-powered (AC power removed)
  - PCM number (1 or 2)
- Fan failed
  - PCM number (1 or 2)
  - Fan number (1 of 3)
- Fan returned to operational state
  - PCM number (1 or 2)
  - Fan number (1 of 3)

## Generic Notification

The generic notification reports events other than the defined event types. It provides a description object that identifies the event in clear text.

**qsrGenericEvent** uses the following objects:

- `qsrEventTimeStamp`
- `qsrEventSeverity`
- `qsrEventDescription`

Generic notifications are sent for the following events:

- FC port configuration change
  - Blade number (1 or 2)
  - Port number (1 of 4)
- iSCSI port configuration change
  - Blade number (1 or 2)
  - Port number (1 of 4)
- iSNS configuration change
  - Blade number (1 or 2)
- NTP configuration change
  - Blade number (1 or 2)

- Router configuration change
  - Blade number (1 or 2)
- Management port configuration change
  - Blade number (1 or 2)
- Firmware upgrade complete
  - Blade number (1 or 2)
- Reboot blade
  - Blade number (1 or 2)

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## Notes

# C Log Messages

This appendix provides details about messages logged to a file. (For details, see information about viewing the router logs in the *iSR6200 Router CLI User's Guide* or the *iSR6200 Router Manager User's Guide*.) The message log is persistent because it is maintained across router power cycles and reboots.

Information in [Table C-1](#) is organized as follows:

- The **ID** column specifies the message identification numbers in ascending order.
- The **Log Message** column indicates the message text displayed in the CLI or SANsurfer Router Manager router log. Note that:
  - ❑ Log messages for the iSCSI driver module are common to both iSCSI ports. Log messages beginning with #0 denote iSCSI port 1 (GE1) and log messages beginning with #1 denote iSCSI port 2 (GE2).
  - ❑ Log messages for the FC driver module are common to both FC ports. Log messages beginning with #0 denote FC port 1 (FC1) and log messages beginning with #1 denote FC port 2 (FC2).
- The **Module Type** column specifies the message reporting module, where:
  - ❑ **App** = Application module
  - ❑ **FC** = FC driver
  - ❑ **iSCSI** = iSCSI driver
  - ❑ **System** = System module
  - ❑ **TOE** = TCP/IP offload engine module
  - ❑ **User** = User module
- The **Msg. Type** column specifies the log message type, where:
  - ❑ **Error** = Error log message

- ☐ **Fatal** = Fatal log message
- ☐ **Info** = Informational log message
- The **Description** column provides additional information about the log message.

**Table C-1. All iSR6250 Router Log Messages**

ID	Log Message	Module Type	Msg. Type	Description
40967	QLBA_NullDoorbell: driver unloaded, port disabled	App	Error	NULL doorbell routine for unloaded drivers. When a driver is unloaded, the doorbell routine is redirected to this NULL routine.
40996	QLBA_ProcessTrb: Processing unsupported ordered tag command	App	Error	Processing unsupported ordered tag task management command.
41004	QLBA_ProcessTrb: Processing unsupported head of queue tag command	App	Error	Processing unsupported head-of-queue task management command.
41058	QLBA_CreateTargetDeviceObject: Too many devices	App	Error	Unable to create an object for the target device; exceeded the maximum number of target devices.
41060	QLBA_CreateTargetNodeObject: Too many devices	App	Error	Unable to create an object for the target node; exceeded the maximum number of target devices.
41067	QLBA_CreateLunObject: LunObject memory unavailable	App	Error	Memory unavailable for LUN object.
41077	QLBA_CreateInitiatorObject: Too many initiators	App	Error	Unable to create an object for initiator object; exceeded the maximum number of initiators.
41096	QLBA_DisplayTargetOperationStatus: PCI Error, Status 0x%.2x	App	Error	Process control block status indicates that a peripheral component interface/interconnect (PCI) error occurred during a target operation.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
41106	QLBA_DisplayInitiatorOperationStatus: DMA Error, Status 0x%.2x	App	Error	Process control block status indicates that a direct memory access (DMA) error occurred during an initiator operation.
41107	QLBA_DisplayInitiatorOperationStatus: Transport Error, Status 0x%.2x	App	Error	Process control block status indicates that a transport error (protocol) occurred during an initiator operation.
41111	QLBA_DisplayInitiatorOperationStatus: Data Overrun, Status 0x%.2x	App	Error	Process control block status indicates that a data overrun error occurred during an initiator operation.
41234	QLIS_LoginPduContinue: Operation failed. Initiator 0x%x, TPB status 0x%x	App	Error	iSCSI login failed between receipt of protocol data unit (PDU) and request for the data segment.
41238	QLKV_ValidateLoginTransitCsgNsgVersion failed (status 0x%x)	App	Error	iSCSI login failed due to unsupported version number in received login PDU.
41257	QLIS_LoginPduContinue: Invalid initiator name. Initiator:	App	Error	iSCSI Login PDU contains invalid initiator name. The format and character set used to form the initiator name is invalid.
41265	QLIS_LoginPduContinue: Target not configured for Portal	App	Error	iSCSI target login was attempted to a portal (iSCSI1 or iSCSI2) on which the target is not presented.
41267	QLIS_LoginPduContinue: Target not found. Target name:	App	Error	iSCSI Login PDU received for a target with a target name unknown to the router.
41268	QLIS_LoginPduContinue: Missing target name	App	Error	iSCSI Login PDU received without a target name for a normal session.
41270	QLIS_LoginPduContinue: TSIH is 0 but InitiatorName key/value not provided	App	Error	iSCSI Login PDU received without an initiator name key/value.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
41272	QLIS_LoginPduContinue: CONN_STATE_IN_LOGIN, Unknown InitTaskTag	App	Error	iSCSI Login PDU received with an incorrect initiator task tag for a session which is partially logged in. This would occur if a login PDU other than the initial login PDU used an initiator task tag which was different than the initiator task tag provided in the initial login PDU.
41283	QLIS_LoginPduContinue: TSIH 0x%x out of range	App	Error	iSCSI login PDU was received with a target session identifying handle (TSIH) out of range. This would occur if the iSCSI initiator attempting the login failed to used the TSIH value provided in the Target Login Response PDU (router is target) in subsequent login PDUs.
41284	QLIS_LoginPduContinue: Session does not exist, invalid TSIH 0x%x	App	Error	iSCSI Login PDU was received with an invalid TSIH value. The TSIH is invalid because there is no session with that TSIH value. This would occur if the iSCSI initiator attempting the login failed to used the TSIH value provided in the target login response PDU (router is target) in subsequent login PDUs.
41353	QLIS_LoginPduContinue: Session does not exist, invalid TSIH 0x%x	App	Error	iSCSI Login rejected due to a CHAP authentication error.
41354	QLIS_LoginPduContinue: Unexpected CHAP key detected	App	Error	iSCSI Login rejected due to a CHAP key error

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
41508	QLBI_SetPortInfo: QLUT_AllocatePortalObject failed (Port-Type 0x%x, PortId 0x%x)	App	Error	Failed to allocate an object for <i>Set Port Info</i> IOCTL processing:  PortType: 0 = FC, 1 = iSCSI PortId: 0 = FC1 or iSCSI1(GE1), 1 = FC2 or iSCSI2 (GE2)
41626	QLBI_GetLunInfo: INQUIRY failed, TPB status 0x%x	App	Error	Inquiry command failed. The Inquiry command was issued by the router as part of its discovery process.
41629	QLBI_GetLunInfo: INQUIRY failed, TPB status 0x%x	App	Error	Pass-Through command for Inquiry command for page 83 failed. The Inquiry command was issued by the router as part of its discovery process.
41635	QLBI_Passthru: Invalid data length %d bytes	App	Error	Pass-Through command for Read Capacity command failed. The Read Capacity command was issued by the router as part of its discovery process.
41636	QLBI_GetLunInfo: INQUIRY failed, TPB status 0x%x	App	Error	Read Capacity command failed. The Read Capacity command was issued by the router as part of its discovery process.
41696	QLBI_GetLunInfo: INQUIRY failed, TPB status 0x%x	App	Error	Pass-Through command issued by management application (such as GUI) was aborted.
41700	QLBI_Passthru: Invalid CDB length %d bytes	App	Error	Pass-Through command issued by management application (such as GUI) failed due to invalid command descriptor block (CDB) length.
41701	QLBI_Passthru: Invalid data length %d bytes	App	Error	Pass-Through command issued by management application (such as GUI) failed due to invalid data length.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
41717	QLBI_Passthru: Invalid data length %d bytes	App	Error	Pass-Through command issued by management application (such as GUI) was interrupted or timed out.
41750	QLBI_Ioctl: ERROR: Operation (0x%x) not supported in this mode	App	Error	IOCTL operation unsupported. Operation code provided in log message.
41768	QLBI_GetLunList: REPORT LUNS command failed	App	Error	Report LUNs command failed. The Report LUNs command was issued by the router as part of its discovery process.
41769	QLBI_GetLunList: REPORT LUNS command failed with CHECK CONDITION, SCSI STATUS 0x%02X	App	Error	Report LUNs command failed with check condition status. The Report LUNs command was issued by the router as part of its discovery process.
41771	QLBI_GetLunList: Lun allocation failed for LunId %d	App	Error	Failed to allocate LUN object; out of resources.
41994	QLFC_Login: VpIndex (%d) out of range	App	Error	Login attempted using FC virtual port (VP) index that is out-of-range (range = 0–31). Index reported in log message.
41995	QLFC_Login: VP Index 0x%x not configured	App	Error	Login attempted using FC VP index that has not been configured. Operation attempted on an unconfigured VP.
42002	QLFC_Login: Can't open connection	App	Error	Attempting login but FC connection cannot be opened.
42024	QLFC_Logout: No active path to device. WWPN: %.2X%.2X%.2X%.2X%.2X%.2X%.2X%.2X	App	Error	Attempting logout of device for which there is no active path (WWPN not found).

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
42027	QLFC_Logout: VP Index 0x%x not configured	App	Error	Logout attempted using FC VP index that has not been configured. Operation attempted on an unconfigured VP.
42068	QLFC_HandleTeb: System Error	App	Error	Event notification; FC processor encountered a system error (unrecoverable firmware error).
42069	QLFC_HandleTeb: Driver Fatal Error	App	Error	Event notification; FC driver encountered a fatal error.
42072	QLFC_HandleTeb: Driver Fatal Error	App	Error	Event notification; FC port logged out.
42242	QLIS_AllocateSessionObject: Out of session resources	App	Error	Failed to allocate object for iSCSI session; out of session resources.
42252	QLIS_EnqueueiScsiPdu: Duplicate PDU, CmdSN %d (0x%x), dropping it	App	Error	Received iSCSI PDU with duplicate command sequence number (CmdSN). Command PDU will be dropped.
42258	QLIS_InstantiateSession: Can't add Initiator to the database	App	Error	Unable to allocate iSCSI initiator object while instantiating session.
42259	QLIS_InstantiateSession: Maximum number (%d) of allowed hosts already logged in	App	Error	iSCSI session login rejected because the maximum number of allowed hosts are already logged in.
42404	QLIS_InstantiateSession: Maximum number (%d) of allowed hosts already logged in	App	Error	Failed to execute iSCSI Command PDU because its CmdSN is out-of-range. Log message contains the incorrect CmdSN, the valid CmdSN range, the first byte of the CDB, and the data length.
42648	QLIS_HandleTeb: Driver Fatal Error	App	Error	Event notification; iSCSI driver encountered a fatal error.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
42649	QLIS_HandleTeb: Unload Driver	App	Error	Event notification; an IOCTL request was received to unload the iSCSI driver.
42654	QLIS_HandleTeb: iSNS Connection Failed	App	Error	Event notification; attempt to connect to the iSNS server failed.
43265	QLUT_AllocateTpbExtension: TPB allocation failed	App	Error	Failed to allocate memory for TPB extension.
43267	QLUT_AllocateTpbExtension: Alloc of DSD failed for buffer len %d	App	Error	Failed to allocate data segment descriptor (DSD) (buffer length %d).
43268	QLUT_AllocateTpbExtension: Data buffer allocation failed (length %d)	App	Error	Failed to allocate data buffer (length %d)
53254	System Booting Up.	App	Info	Router is booting up.
53357	QLBA_ProcessTpb: De-compression failed. Disabling compression temporarily	App	Info	Decompression failed. Disabling compression temporarily.
53584	QLIS_LoginPduContinue: [0x%x] SES_STATE_LOGGED_IN NORMAL	App	Info	iSCSI session full feature login.
53585	QLIS_LoginPduContinue: [0x%x] SES_STATE_LOGGED_IN DISCOVERY	App	Info	iSCSI session discovery login.
53586	QLIS_LoginPduContinue: Initiator: %s	App	Info	iSCSI login of Initiator: %s
53587	QLIS_LoginPduContinue: Target: %s	App	Info	iSCSI login of Target: %s
54274	QLFC_Login: Origin 0x%x, VP Index 0x%x, Id 0x%x	App	Info	FC login occurred, origin xx (1 = adapter, 2 = target, 3 = initiator), VP (virtual port) xx, ID (loop ID) xx.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
54275	QLFC_Login: Port ID %.2x%.2x%.2x	App	Info	FC login occurred with port ID xx.xx.xx.
54276	QLFC_Login: Node Name %.2x%.2x%.2x%.2x%.2x%.2x%.2x%.2x	App	Info	FC login occurred with WWNN xx.xx.xx.xx.xx.xx.xx.xx.
54277	QLFC_Login: Port Name %.2x%.2x%.2x%.2x%.2x%.2x%.2x%.2x	App	Info	FC login occurred with WWPN xx.xx.xx.xx.xx.xx.xx.xx.
54306	QLFC_Logout: Origin 0x%x, VP Index 0x%x, Id 0x%x	App	Info	FC Logout: Origin 0x%x, VP Index 0x%x, Id 0x%x
54307	QLFC_Logout: Port ID %.2x%.2x%.2x	App	Info	FC Logout: Port ID %.2x%.2x%.2x
54308	QLFC_Logout: Node Name %.2x%.2x%.2x%.2x%.2x%.2x%.2x%.2x	App	Info	FC Logout: Node Name xx xx xx xx xx xx xx xx.
54309	QLFC_Logout: Port Name %.2x%.2x%.2x%.2x%.2x%.2x%.2x%.2x	App	Info	FC Logout: Port Name xx xx xx xx xx xx xx xx
54359	QLFC_Logout: Port Name %.2x%.2x%.2x%.2x%.2x%.2x%.2x%.2x	App	Info	FC login event notification, VP (virtual port) xx.
54683	QLIS_OpenConnectionNotification: Target connection opened (Port %d, DDB %d)	App	Info	iSCSI target connection opened for port %d, data description block (DDB) %d.
54938	QLIS_OpenConnectionNotification: Target connection opened (Port %d, DDB %d)	App	Info	Event notification; iSCSI open connection request.
54939	QLIS_HandleTeb: UTM_EC_CLOSE_CONNECTION or UTM_EC_CONNECTION_CLOSED	App	Info	Event notification; iSCSI close connection request or connection closed.
54940	QLIS_HandleTeb: UTM_EC_CLOSE_CONNECTION or UTM_EC_CONNECTION_CLOSED	App	Info	Event notification; iSCSI connection closed.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
54941	QLIS_HandleTeb:iSNS Server Open Connection succeeded	App	Info	Event notification; connection opened with iSNS server.
54943	QLIS_HandleTeb: UTM_EC_ISNS_SCN	App	Info	Event notification; iSNS registered state change notification (RSCN) received.
54945	QLIS_HandleTeb: UTM_EC_ISNS_CLIENT_DISCOVERED	App	Info	Event notification; iSNS client discovered.
69652	#:d: qlutm_init: Diagnostic failed, invalid SRAM	iSCSI	Fatal	iSCSI processor SRAM test failed.
69653	#:d: qlutm_init: Diagnostic failed, fail reboot	iSCSI	Fatal	iSCSI processor failed diagnostic reboot.
69654	#:d: qlutm_init: Diagnostic failed, invalid NVRAM	iSCSI	Fatal	iSCSI processor failed NVRAM diagnostic.
69655	#:d: qlutm_init: Diagnostic failed, invalid DRAM	iSCSI	Fatal	iSCSI processor failed DRAM diagnostic.
69656	#:d: qlutm_init: Failed to return diagnostic result to Bridge	iSCSI	Fatal	iSCSI processor failed to return diagnostic results.
69941	#:d: QLUtmProcessResponseQueue: Invalid handle %x EntryType %x	iSCSI	Fatal	Response queue entry contains an invalid handle.
69951	#:d: QLSetNvram: QLRebootTimer failed AF %x RS %x Time %d	iSCSI	Fatal	Set NVRAM reboot timer failed.
69964	#:d: QLDisable: QLRebootTimer failed AF %x RS %x Time %d	iSCSI	Fatal	Port disable reboot timer failed.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
69966	##d: QLEnable: QLRebootTimer failed AF %x RS %x Time %d	iSCSI	Fatal	Port enable reboot timer failed.
70224	##d: QLProcSrblessiSNSResponse: Invalid handle %x	iSCSI	Fatal	iSNS response contains an invalid handle.
70400	##d: QLInitializeDevice: QLStartAdapter failed	iSCSI	Fatal	Start iSCSI processor failed.
70417	##d: QLInitializeAdapter: QLInitializeFW failed	iSCSI	Fatal	iSCSI processor firmware initialization failed.
70432	##d: QLDoInterruptServiceRoutine: PortFatal interrupt. PortFatalErrorStatus %08x CSR %08x AS %x AF %x	iSCSI	Fatal	iSCSI processor port fatal error.
70448	##d: QLStartAdapter: QLRebootTimer failed AF %x RS %x Time %d	iSCSI	Fatal	Start iSCSI processor reboot timer failed.
70489	##d: QLIsrDecodeMailbox: System Error 8002 MB[1-7] %04x %04x %04x %04x %04x %04x	iSCSI	Fatal	iSCSI processor fatal system error.
70499	##d: QLProcessResponseQueue: Invalid handle for ET_PASSTHROUGH_STATUS	iSCSI	Fatal	Response queue invalid handle for ET pass-through.
70501	##d: QLProcessResponseQueue: Invalid entry type in response queue %x	iSCSI	Fatal	Response queue invalid entry type.
70502	##d: QLProcessResponseQueue: Invalid handle %x EntryType %x	iSCSI	Fatal	Response queue invalid handle for specified entry type.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
70524	##d: QLProcessAen: Invalid event %x	iSCSI	Fatal	Asynchronous event for unknown event type.
70544	##d: QLRebootTimer: Reboot failed!	iSCSI	Fatal	Reboot timer failed.
70563	##d: QLRebootTimer: Reboot failed!	iSCSI	Fatal	iSCSI driver missed iSCSI processor heartbeat. iSCSI processor rebooted.
70564	##d: QLRebootTimer: Reboot failed!	iSCSI	Fatal	iSCSI processor failed to complete operation before timeout.
70609	##d: QLRebootTimer: Reboot failed!	iSCSI	Fatal	iSCSI processor system error restart.
70610	##d: QLProcessSystemError: RebootHba failed	iSCSI	Fatal	iSCSI processor reboot failed.
70784	##d: QLConfigChip: invalid NVRAM	iSCSI	Fatal	iSCSI processor NVRAM invalid (checksum error).
70835	##d: QLStartFw: MBOX_CMD_SET_FLASH failed %x	iSCSI	Fatal	The iSCSI controller Set Flash command failed.
70836	##d: QLStartFw: Invalid Fw loader state 0x%x	iSCSI	Fatal	The iSCSI controller failed to load firmware.
70837	##d: QLStartFw: Load Fw loader timeout	iSCSI	Fatal	The iSCSI controller firmware load operation timed out.
70938	##d: ql_adapter_up: Failed to initialize adapter	iSCSI	Fatal	The iSCSI controller failed to initialize.
72351	##d: QLProcSrblessiSNSResponse: Invalid handle %x	iSCSI	Fatal	The iSCSI controller reported that an SNS response had an invalid handle.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
73990	##d: QLUtmIoctlEnable: Initialize FW failed	iSCSI	Error	The iSCSI processor failed firmware initialization.
74056	##d: QLRUNDiag: MBOX Diag test internal loopback failed %x %x	iSCSI	Error	The iSCSI processor failed the internal loopback test.
74057	##d: QLRUNDiag: MBOX Diag test external loopback failed %x %x	iSCSI	Error	The iSCSI processor failed the external loopback test.
74068	##d: QLUtmReceiveScsiCmd: Invalid ATIO Continuation type %x	iSCSI	Error	The iSCSI processor reported an invalid Accept Tar-get I/O (ATIO) Continuation type x.
74069	##d: QLUtmProcessResponseQueue: Immediate data addr %08x:%08x in unsupported PduType	iSCSI	Error	The iSCSI processor reported an Immediate data address (xxxxxxxx:xxxxxxxx) in an unsupported PDU Type.
74241	##d: QLiSNSEnableCallback: iSNS Server TCP Connect failed	iSCSI	Error	The iSCSI processor could not connect with the iSCSI name server (iSNS).
74577	##d: QLIsrDecodeMailbox: NVRAM invalid	iSCSI	Error	The iSCSI processor reported that the iSCSI port NVRAM contains invalid data (checksum error).
74580	##d: QLIsrDecodeMailbox: AEN %04x, Duplicate IP address detected, MB[1-5] %04x %04x %04x %04x	iSCSI	Error	The iSCSI processor reported a duplicate IP address was detected (address xxxx xxxx xxxx xxxx xxxx).
74587	##d: QLIsrDecodeMailbox: Link down	iSCSI	Error	The iSCSI processor reported a link down condition.
74656	##d: QLReadyTimer: Adapter missed heartbeat for %d seconds. Time left %d	iSCSI	Error	The driver failed to receive a heartbeat from the iSCSI processor for the specified number of seconds.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
74659	<code>##d: QLReadyTimer: Adapter missed heart-beat for 0x%x seconds</code>	iSCSI	Error	The iSCSI processor (adapter) failed to provide a heartbeat for x seconds.
74660	<code>##d: QLReadyTimer: Abort pTpb=%p failed, DrvCount 0x%x</code>	iSCSI	Error	The iSCSI processor failed to complete an abort request.
74661	<code>##d: QLTimer: Abort pTpb=%p, Type %x, Timeout 0x%x DrvCount 0x%x, DdbIndex 0x%x</code>	iSCSI	Error	The driver timed out an iSCSI processor operation and is aborting the operation.
74663	<code>##d: QLReadyTimer: MBOX_CMD %04x %04x %04x %04x %04x %04x %04x %04x timed out</code>	iSCSI	Error	The driver timed out an iSCSI processor mailbox command.
74665	<code>##d: QLReadyTimer: QLisSNSReenable failed.</code>	iSCSI	Error	The driver timed out while attempting to reconnect with the iSNS.
74705	<code>##d: QLProcessSystemError: Restart RISC</code>	iSCSI	Error	The iSCSI processor was restarted.
74746	<code>##d: QLInitializeFW: MBOX_CMD_INITIALIZE_FIRMWARE failed %04x %04x %04x %04x %04x</code>	iSCSI	Error	The iSCSI processor rejected the firmware initialize command.
74784	<code>##d: QLUpdateInitiatorData: No more room in Initiator Database.</code>	iSCSI	Error	The driver's initiator database is full. The driver is capable of storing 1024 iSCSI initiators in its database. Use the CLI or GUI to remove unwanted/unused iSCSI initiators.
74800	<code>##d: QLSetTargetData: No more room in Target Database.</code>	iSCSI	Error	The driver's target database is full. Use the CLI or GUI to remove unwanted/unused iSCSI targets.
75008	<code>##d: ql_process_error: OB_TCP_IOCB_RSP_W returned DdbInx 0x%x pTpb %p</code>	iSCSI	Error	A TCP retry for a frame failed on the connection ddbIndex. Tpb contains the frame memory address.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
86347	##d: QLDisable: Restart RISC	iSCSI	Info	Restart iSCSI processor (RISC).
86349	##d: QLEnable: Restart RISC to update EEPROM	iSCSI	Info	EEPROM updated, restart iSCSI processor (RISC).
86874	##d: QLIsrDecodeMailbox: Link up	iSCSI	Info	Link up reported by iSCSI processor for GE1 or GE 2.
87346	##d: QLGetFwStateCallback: link 100Mb FDX	iSCSI	Info	The iSCSI controller reported a link speed/configuration of 100Mb full-duplex (FDX).
87348	##d: QLGetFwStateCallback: link 1000Mb FDX	iSCSI	Info	The iSCSI controller reported a link speed/configuration of 1000Mb FDX.
87350	##d: QLGetFwStateCallback: Invalid link speed 0x%x	iSCSI	Info	The iSCSI controller reported an invalid link speed.
102419	##d: qlutm_init: Diagnostic failed, port 1 invalid SRAM	FC	Fatal	FC1 processor SRAM test failed.
102420	##d: qlutm_init: Diagnostic failed, port 1 POST failed	FC	Fatal	FC1 processor power-on self-test (POST) failed.
102421	##d: qlutm_init: Diagnostic failed, port 2 invalid SRAM	FC	Fatal	FC2 processor SRAM test failed.
102422	##d: qlutm_init: Diagnostic failed, port 2 POST failed	FC	Fatal	FC2 processor POST failed.
102423	##d: qlutm_init: Failed to return diagnostic result to Bridge	FC	Fatal	FC processor failed to return diagnostic results.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
102656	##d: QLInitializeAdapter: Reset ISP failed	FC	Fatal	FC processor failed reset.
102657	##d: QLInitializeAdapter: Load RISC code failed	FC	Fatal	FC processor firmware load failed.
102658	##d: QLInitializeAdapter: Load ISP2322 receive sequencer code failed	FC	Fatal	FC processor receive sequencer code load failed.
102659	##d: QLInitializeAdapter: Load ISP2322 transmit sequencer code failed	FC	Fatal	FC processor transmit sequencer code load failed.
102662	##d: QLInitializeAdapter: Verify Checksum command failed (%x)	FC	Fatal	FC processor firmware checksum failed.
102680	##d: QLInitializeFW: FAILED	FC	Fatal	FC processor firmware initialization failed.
102688	##d: QLInterruptServiceRoutine: Risc pause %x with parity error hccr %x, Disable adapter	FC	Fatal	FC processor paused due to internal parity error.
102689	##d: QLInterruptServiceRoutine: Invalid interrupt status: %x	FC	Fatal	FC processor returned an invalid interrupt status.
102716	##d: QLIsrEventHandler: System error event (%x), MB1=%x, MB2=%x, MB3=%x, MB4=%x, MB5=%x, MB6=%x, MB7=%x	FC	Fatal	FC processor system error.
102746	##d: QLProcessResponseQueue: Invalid handle %x, type %x	FC	Fatal	Response queue entry contains an invalid handle.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
102752	##d: QLTimer: Ext Ram parity error exceed limit cnt 0x%x, limit 0x%x, Disabled adapter	FC	Fatal	FC processor external SRAM parity error count exceeded limit; FC port disabled.
102755	##d: QLTimer: Heartbeat failed	FC	Fatal	FC processor heartbeat failed.
102800	##d: QLRestartRisc: restart RISC	FC	Fatal	FC processor being restarted.
106583	##d: QLUtmReceiveIo: Path invalid/FW No resource count %x	FC	Error	The FC processor received a SCSI command for an unknown target path or has run out of resources to execute additional commands.
106589	##d: QLIoctlEnable: Adapter disabled	FC	Error	The FC processor was disabled by an IOCTL request to the driver.
106590	##d: QLIoctlEnable: Initialize FW error	FC	Error	The FC processor firmware failed initialization. The request to initialize was received by the driver in an IOCTL request.
106592	##d: QLIoctlRunDiag: Diagnostic loopback command failed %x % %x %x	FC	Error	The FC processor failed the external loopback test.
106593	##d: QLIoctlDisable: Re-initialize adapter failed	FC	Error	The FC processor failed to re-initialize in response to an IOCTL disable request.
106803	##d: QLIsrEventHandler: Link down (%x)	FC	Error	The FC processor reported a link down condition.
106813	##d: QLIsrEventHandler: Unexpected async event (%x), MB1=%x, MB2=%x, MB3=%x, MB4=%x, MB5=%x, MB6=%x, MB7=%x	FC	Error	The FC processor reported an unexpected asynchronous event. The mailbox registers provide status, event code, and data related to the event.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
106847	##d: QLProcessResponseQueue: Invalid EntryStatus %x, type %x	FC	Error	The FC controller reported an invalid Entry Status %x, type %x.
106851	##d: QLTimer: Heartbeat failed	FC	Error	The FC controller failed to provide a heartbeat.
106853	##d: QLTimer: Link error count (0x%x) exceeded, link down	FC	Error	The driver has determined that the FC link is unreliable and unusable due to the number of errors encountered. The link has been taken down.
106912	##d: QLReserveLoopId: out of loop Ids	FC	Error	The FC processor was unable to obtain the number of loop IDs required. This failure occurs only when the FC processor is running multi-ID firmware.
106928	##d: QLMarkDeviceOffline: Device Id: %x marked offline, cLinkDownTimeout = %x, cPortDownRetryCount=%x	FC	Error	The driver was unable to re-establish connection to the target within the timeout and retry counts, and is therefore marking it <i>offline</i> .
106948	##d: QLSnsGetAllNext: Name server login FAILED %x	FC	Error	The FC processor is unable to log into the FC fabric name server.
107029	##d: QLUpdateDeviceData: out of slots in host database	FC	Error	The driver's host (initiator) database is full.
107030	##d: QLUpdateDeviceData: out of slots in target database	FC	Error	The driver's target database is full.
107041	##d: QLUpdateDeviceDatabase 0x%x: GET_ID failed %x	FC	Error	The driver's host (initiator) database is full. Maximum host database is 64.
107056	##d: QLUpdateDeviceDatabase 0x%x: out of slots in host database	FC	Error	The drivers host (initiator) database is full.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
107078	<code>QLUpdatePort 0x%x: out of slots in host database</code>	FC	Error	The driver was unable to re-establish connection to the target within the timeout and retry counts, and is therefore marking it <i>offline</i> .
107984	<code>QLWriteFlashDword: Write fails at addr 0x%x data 0x%x</code>	FC	Error	The FC controller failed a Flash write (address x data x).
108032	<code>QLGetVpDatabase: MBOX_CMD_GET_VP_DATABASE for VP %d fatal error</code>	FC	Error	The FC controller failed the Get VP Database command (for virtual port %d).
108033	<code>QLGetVpDatabase: MBOX_CMD_GET_VP_DATABASE for VP %d failed %x</code>	FC	Error	The FC controller failed the Get VP Database command (for virtual port %d) with status x.
108049	<code>QLVerifyMenloFw: EXECUTE_COMMAND_IOCTL failed MB0 %x MB1 %x</code>	FC	Error	The FC controller reported failure status for an Execute IOCB (input/output control block) command.
108050	<code>QLVerifyMenloFw: EXECUTE_COMMAND_IOCTL fatal error</code>	FC	Error	The FC controller reported a fatal error while processing an Execute IOCB command.
108064	<code>QLGetFwState: Get Firmware State failed 0-3 %x %x %x %x</code>	FC	Error	The FC controller reported failure status for a Get Firmware State command.
118882	<code>QLIoctlDisable: Reset adapter</code>	FC	Info	Request to reset the FC processor (adapter) received from ioctl interface.
119088	<code>QLIsrEventHandler: LIP occurred (%x): mailbox1 = %x</code>	FC	Info	FC loop initialization process (LIP) occurred. The LIP type is reported, as is the contents of the FC processor's mailbox 1 register.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
119089	<code>msgid: QLIsrEventHandler: LIP reset occurred (%x): mailbox1 = %x</code>	FC	Info	FC LIP reset occurred. The LIP reset type is reported, as is the contents of the FC processor's mailbox 1 register.
119090	<code>msgid: QLIsrEventHandler: Link up (%x) mailbox1 = %x</code>	FC	Info	FC link up occurred. Event status is reported, as is the contents of the FC processor's mailbox 1 register.
119092	<code>msgid: QLIsrEventHandler: Link mode up (%x): RunTimeMode=%x</code>	FC	Info	FC link up occurred. Event status is reported, as is the RunTimeMode (0 = loop, 1 = point-to-point).
119093	<code>msgid: QLIsrEventHandler: RSCN update (%x) rscnInfo: %x</code>	FC	Info	An RSCN was received. Event status is reported, as is the RSCN information.
119097	<code>msgid: QLIsrEventHandler: Port update (%x) mbl-3 %x %x %x</code>	FC	Info	FC port update. Event status is reported, as is the contents of the FC processor's mailbox 1, 2, and 3 registers.
139265	<code>QBRPC_Initialize: Entered</code>	User	Error	RPC (remote procedure call) server initialization entry point.
139266	<code>QBRPC_Initialize:GetBridge Mem Allocation error</code>	User	Error	Get System API memory allocation failed.
139267	<code>QBRPC_Initialize:GetBridgeAdv Mem Allocation error</code>	User	Error	Get System Advanced API memory allocation failed.
139268	<code>QBRPC_Initialize:GetMgmt Mem Allocation error</code>	User	Error	Get Management API memory allocation failed.
139269	<code>QBRPC_Initialize:GetIscsi Mem Allocation error</code>	User	Error	Get iSCSI API memory allocation failed.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
139270	QBRPC_Initialize:GetIscsiAdv Mem Allocation error	User	Error	Get iSCSI advanced API memory allocation failed.
139271	QBRPC_Initialize:GetIsns Mem Allocation error	User	Error	Get iSNS API memory allocation failed.
139272	QBRPC_Initialize:GetFcIntfc Mem Allocation error	User	Error	Get FC Interface API memory allocation failed.
139273	QBRPC_Initialize:GetFcAdv Mem Allocation error	User	Error	Get FC Advanced API memory allocation failed.
139280	QBRPC_Initialize:GetFcSfp Mem Allocation error	User	Error	Failed memory allocation for Get FC SFP API.
139281	QBRPC_Initialize:GetLog Mem Allocation error	User	Error	Failed memory allocation for Get Log API.
139282	QBRPC_Initialize:GetStats Mem Allocation error	User	Error	Failed memory allocation for Get Statistics API.
139283	QBRPC_Initialize:InitListMem Allocation error	User	Error	Failed memory allocation for Get Initiator List API.
139284	QBRPC_Initialize:TargetList Mem Allocation error	User	Error	Failed memory allocation for Get Target List API.
139285	QBRPC_Initialize:LunList MemAllocation error	User	Error	Failed memory allocation for Get LUN List API.
139286	QBRPC_Initialize:PresTarget Mem Allocation error	User	Error	Failed memory allocation for Get Presented Targets List API.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
139287	QBRPC_Initialize:LunMask Mem Allocation error	User	Error	Failed memory allocation for Get LUN Mask API.
139288	QBRPC_Initialize:Init Mem Allocation error	User	Error	Failed memory allocation for Initiator API.
139289	QBRPC_Initialize:TgtDevice Mem Allocation error	User	Error	Failed memory allocation for Target Device API.
139296	QBRPC_Initialize:FcTgt Mem Allocation error	User	Error	Failed memory allocation for FC Target API.
139297	QBRPC_Initialize:BridgeStatus Mem Allocation error	User	Error	Failed memory allocation for System Status API.
139298	QBRPC_Initialize:Diag Mem Allocation error	User	Error	Failed memory allocation for Diagnostic API.
139299	QBRPC_Initialize:DiagLog Mem Allocation error	User	Error	Failed memory allocation for Diagnostic Log API.
139300	QBRPC_Initialize:FruImage Mem Allocation error	User	Error	Failed memory allocation for FRU Image API.
139301	QBRPC_Initialize:OemMfg Mem Allocation error	User	Error	Failed memory allocation for OEM Manufacturing API.
139302	QBRPC_Initialize:Status Mem Allocation error	User	Error	Failed memory allocation for Status API.
139303	QBRPC_Initialize:TcpIpStats Mem Allocation error	User	Error	Failed memory allocation for TCP/IP Statistics API.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
139304	QBRPC_Initialize:NtpStats Mem Allocation error	User	Error	Failed memory allocation for NTP Status API.
139305	QBRPC_Initialize:LunList MemAlloc error	User	Error	Failed memory allocation for LUN List API.
139315	QBRPC_FreeResources:Entered	User	Error	RPC free resources entry point.
139553	checkDuplicateIp: Detected Error %08x %08x%04x	User	Error	Detected duplicate IP address for management port.
151842	FW Upgrade performed: new version is: %d.%d.%d.%d	User	Info	A firmware upgrade was performed, the new version is: <i>d.d.d.d</i> .
151843	REBOOT/SHUTDOWN Command from user. Code=%d	User	Info	User issued a REBOOT or SHUTDOWN command.
151889	#: qapisetfcinterfaceparams_1_svc: FC port configuration changed	User	Info	The FC port configuration has changed.
151890	#: qapisetiscsiinterfaceparams_1_svc: iSCSI port configuration changed	User	Info	The iSCSI port configuration has changed.
151891	#: qapisetisns_1_svc: iSNS configuration changed	User	Info	The iSNS configuration has changed.
151892	qapisetntpparams_1_svc: NTP configuration changed	User	Info	The NTP configuration has changed.
151893	#: qapisetvlanparams_1_svc: VLAN configuration changed	User	Info	The VLAN configuration has changed.
151894	qapisetlunmask_1_svc: Lunmask added for LUN %d	User	Info	A LUN mask was added for LUN %d.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
151895	qapisetlunmask_1_svc: Lunmask removed for LUN %d	User	Info	The LUN mask was removed for LUN %d.
151896	qapisetmgmintfcparams_1_svc:Management port configuration changed	User	Info	The management port configuration has changed.
151897	qapisetbridgebasicinfo_1_svc:Bridge configuration changed	User	Info	The router configuration has changed.
151908	GE%d: Port status changed by user to ENABLED.	User	Info	GE port %d was enabled user.
151909	GE%d: Port status changed by user to DISABLED.	User	Info	GE port %d was disabled by user.
151910	FC%d: Port status changed by user to ENABLED.	User	Info	FC port %d was enabled by user.
151911	FC%d: Port status changed by user to DISABLED.	User	Info	FC port %d was disabled by user.
151912	qapimaptargetdevice_1_svc: Target WWPN: %.2x%.2x%.2x%.2x%.2x%.2x%.2x mapped to iSCSI portal %d.	User	Info	The target at WWPN: xx.xx.xx.xx.xx.xx.xx has been mapped to iSCSI portal %d.
151913	qapimaptargetdevice_1_svc: Target WWPN: %.2x%.2x%.2x%.2x%.2x%.2x%.2x unmapped from iSCSI portal %d.	User	Info	The target at WWPN: xx.xx.xx.xx.xx.xx.xx has been unmapped from iSCSI portal %d
152082	qapiaddmodifyinitiator_1_svc : Initiator Configuration Changed	User	Info	An Initiators configuration has changed.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
152083	qapiremoveinitiator_1_svc : Initiator Removed	User	Info	An Initiator has been removed.
152129	sysTempMon: Left PCM Installed	User	Info	The left power and cooling module (PCM) is or has been installed.
152130	sysTempMon: Left PCM Un-installed	User	Info	The left PCM is or has been uninstalled.
152131	sysTempMon: Right PCM Installed	User	Info	The right PCM is or has been installed.
152132	sysTempMon: Right PCM Un-installed	User	Info	The right PCM is or has been uninstalled.
152133	sysTempMon: Power for Left PCM Plugged-in	User	Info	The left PCM is connected AC power.
152134	sysTempMon: Power for Left PCM Un-plugged	User	Info	The left PCM is not connected to AC power (unplugged).
152135	sysTempMon: Power for Right PCM Plugged-in	User	Info	The right PCM is connected AC power.
152136	sysTempMon: Power for Right PCM Un-plugged	User	Info	The right PCM is not connected to AC power (unplugged).
152137	sysTempMon: Slot 1 (R1) PCM Fan%d faulty	User	Info	The left PCM (#1) is reporting a faulty fan.
152138	sysTempMon: Slot 2 (R2) PCM Fan%d faulty	User	Info	The left PCM (#1) is reporting a healthy fan.
152139	sysTempMon: Slot 1 (R1) PCM Fan%d healthy	User	Info	The right PCM (#2) is reporting a faulty fan.
152140	sysTempMon: Slot 2 (R2) PCM Fan%d healthy	User	Info	The right PCM (#2) is reporting a healthy fan.
152141	sysTempMon: Over Temperature Front: %dC Rear: %dC CPU1: %dC CPU2: %dC	User	Info	The router has detected an over temperature, Front: %dC Rear: %dC CPU1: %dC CPU2: %dC
152142	sysTempMon: Setting the fan speed to high	User	Info	The fan(s) speed has been set to high.

**Table C-1. All iSR6250 Router Log Messages (Continued)**

ID	Log Message	Module Type	Msg. Type	Description
152143	sysTempMon: Setting the fan speed to normal	User	Info	The fan(s) speed has been set to normal.
152144	sysTempMon: Temperature back to safe value. Front: %dC Rear: %dC CPU1: %dC CPU2: %dC	User	Info	The router temperature has returned to normal operating range, Front: %dC Rear: %dC CPU1: %dC CPU2: %dC
152145	sysTempMon: Critical Temperature, Shutting Down Front: %dC Rear: %dC CPU1: %dC CPU2: %dC	User	Info	The router has reached a critical temperature and is shutting down, Front: %dC Rear: %dC CPU1: %dC CPU2: %dC
200721	QL3022:ql3xxx_probe: Adapter eth#%d, Invalid NVRAM parameters	TOE	Fatal	A GE port (eth#%d) has invalid NVRAM parameters.
233473	"memory monitor: Detected Uncorrectable Ecc %08lx system is rebooting in 5 secs\n"	System	Fatal	Uncorrectable memory error detected at address provided in log message.
233474	"Failed to register interrupt handler!\n"	System	Fatal	Attempt to register the interrupt handler failed.
233475	"%s class_simple_create failed\n"	System	Fatal	Failed class_simple_create system call from memory monitor initialization routine.
237572	"Failed to kill sys killer %d\n"	System	Error	Failed to kill system task.
237573	Temperature over high threshold %d	System	Error	The router temperature has exceeded the high temperature threshold.
249862	Temperature is back to normal range %d	System	Info	The router temperature has returned to the normal operating range.

# Glossary

## activity LED

A [port](#) LED that indicates when frames are entering or leaving the port.

## adapter

The board that interfaces between the host system and the target devices. Adapter is synonymous with *host bus adapter (HBA)*, *host adapter*, and *adapter board*.

## adapter port

A port on the adapter board.

## adapter port beacon

An LED on the adapter. Flashing it enables you to locate the adapter.

## alarm

A message generated by the switch that specifically requests attention. Alarms are generated by several switch processes. Some alarms can be configured.

## arbitrated loop

A circular (ring) topology (versus point-to-point) where two or more [ports](#) can be interconnected, but only two ports can communicate at a time. All communication passes through all ports connected to the loop.

## ASIC

Application specific integrated circuit. A microchip designed for special applications such as Fibre Channel.

## bandwidth

A measure of the volume of data that can be transmitted at a given transmission rate. A 1-Gbps/2-Gbps FC [port](#) can transmit or receive at nominal rates of 1- or 2-Gbps, depending on the device to which it is connected. This corresponds to actual bandwidth values of 106 MB and 212 MB, respectively.

## boot code

The first program to run when a system is powered on. This is also true for devices within a system.

## CHAP

Challenge-handshake authentication protocol. CHAP is used for remote login, usually between a client and server or a Web browser and Web server. A challenge/response is a security mechanism for verifying the identity of a person or process without revealing a secret password that is shared by the two entities. Also referred to as a *three-way handshake*.

## CNA

Converged network adapters. CNAs support both data networking (TCP/IP) and storage networking (FC) traffic on a single I/O adapter using two new technologies: [Enhanced Ethernet](#) and Fibre Channel over Ethernet (FCoE).

### command line interface (CLI)

Program interface driven by entering commands and parameters.

### CRC

Cyclic redundancy check. A type of check value designed to catch most transmission errors.

### CSV file

Comma separated values file.

### device

A [target](#), typically a disk drive. Hardware such as a disk drive, tape drive, printer, or keyboard that is installed in or connected to a system. In FC, a *target* device.

### driver

The software that interfaces between the file system and a physical data storage device or network media.

### E\_Port

Expansion port. A [port](#) in an FC switch that connects to another FC switch or bridge device by an inter-switch link. E\_Ports are used to link FC switches to form a multi-switch [fabric](#).

### EEPROM

Electrically erasable programmable read-only memory. Memory that can be erased (entirely, not selectively) using higher electrical voltages.

### Enhanced Ethernet

Also called *data center Ethernet* or *converged enhanced Ethernet*. Refers to new enhancements to the existing Ethernet standard that eliminate Ethernet's inherently lossy nature and make 10Gb Ethernet a viable storage networking transport.

### F\_Port

The *fabric* port in an FC fabric switch provides a point-to-point link attachment to a single [N\\_Port](#). F\_Ports are intermediate ports in virtual point-to-point links between end ports, for example N\_Port to F\_Port to F\_Port to N\_Port using a single FC fabric switch.

### fabric

A fabric consists of cross-connected FC devices and switches.

### fabric port

An [F\\_Port](#) or [FL\\_Port](#).

### fabric switch

Also, switched fabric. A fabric switch connects multiple devices from independent FC-arbitrated loops (FC-ALs) and point-to-point topologies into a fabric using FC switches.

### failover path

Software feature that ensures data availability and system reliability by assigning alternate path and automatic [adapter](#) failover for device resources. This feature is available only in Windows 2000/Windows Server 2003/Windows Vista, Novell NetWare, and Red Hat/SuSE Linux. (Windows XP and Windows Server 2008 do *not* support failover.)

### FC

Fibre Channel is a high-speed serial interface technology that supports other higher layer protocols such as [SCSI](#) and [IP](#).

**FC-IP mode**

Data transportation mode in which the iSR6250 transports FC frames over a TCP/IP connection using the [FCIP \(Fibre Channel over IP\)](#) protocol to connect two iSR6250 routers. In FC-IP mode, a port pair (one FC port and an IP port on the same router) on local iSR6250 and another port pair on a remote router form a FCIP route.

**FCIP (Fibre Channel over IP)**

Protocol that enables transmission of Fibre Channel information by tunneling data on a [SAN](#) over IP networks. An alternative to [iSCSI](#). Also known as Fibre Channel tunneling.

**FCoE**

Fibre Channel over Ethernet. A new technology defined by the T11 standards body that allows traditional FC storage networking traffic to travel over an Ethernet link by encapsulating FC frames inside Layer 2 Ethernet frames. For more information, visit [www.fcoe.com](http://www.fcoe.com).

**FL\_Port**

Fabric loop port. In an FC, the [fabric switch](#) is capable of FC arbitrated loop operations and is connected to one or more [NL\\_Ports](#) by an FC Arbitrated Loop. An FL\_Port becomes a shared entry point for public NL\_Port devices to an FC fabric. FL\_Ports are intermediate ports in virtual point-to-point links between end ports that do not reside on the same loop, for example NL\_Port to FL\_Port to F\_Port to N\_Port through a single FC fabric switch.

**flash**

Non-volatile memory where the boot code is saved. At times, flash and [boot code](#) are used interchangeably.

**flash BIOS**

A QLA2xxx [adapter](#)'s flash programmable read-only memory (PROM) contains the code that allows booting from the adapter at startup.

**frame**

Data unit consisting of a start-of-frame (SOF) delimiter, header, data payload, CRC, and an end-of-frame (EOF) delimiter.

**FRU**

Field replaceable unit. Component that can be replaced in the field upon failure.

**G\_Port**

Generic port. A port that can operate as either an E\_Port or an F\_Port. A G\_Port can determine operating mode at switch port initialization, F\_Port when an N\_Port attachment is determined, E\_Port when an E\_Port attachment is determined. See [E\\_Port](#), [F\\_Port](#), [FL\\_Port](#), [L\\_Port](#), [N\\_Port](#), [NL\\_Port](#)

**HA**

High availability. HA refers to a system or device that operates continuously for a long length of time.

**HBA**

Host bus adapter. See [adapter](#).

**heartbeat LED**

A chassis LED that indicates the router status.

**hot replaceable**

Also known as *hot swappable*, this means you can add new devices or remove existing ones when the system is running.

## IANA

Internet Assigned Numbers Authority (IANA) is responsible for the global coordination of the DNS Root, IP addressing, and other Internet protocol resources.

## initiator

System component, such as a network interface card, that originates an I/O operation.

## ioctl

Input/output control. A system call in Unix/Linux systems that allows an application to control or communicate with a device driver outside usual read/write operations.

## IP

Internet Protocol. A method by which data is sent from one computer to another over the Internet. IP specifies the format of packets, also called *datagrams*, and the addressing scheme.

## iSCSI

Internet small computer system interface. Protocol that encapsulates data into IP packets to send over Ethernet connections.

## iSNS

Internet simple name service (iSNS) is used for discovery and management of IP-based SANs.

## L\_Port

Loop port. Does arbitrated loop functions and protocols. NL\_Ports and FL\_Ports are examples of loop-capable ports. See [E\\_Port](#), [F\\_Port](#), [FL\\_Port](#), [G\\_Port](#), [N\\_Port](#), [NL\\_Port](#).

## latency

A measure of how fast a transaction travels through the router.

## LIP

Loop initialization process. The initialization process in an arbitrated loop that occurs when the loop is powered up or a new device is added. One function of a LIP is to assign addresses. All data transmission on the loop is suspended during a LIP.

## load balancing

A software feature that improves system performance by balancing device access between multiple ports for maximum resource efficiency.

## loopback

Diagnostic tool that routes transmit data through a loopback connector back to the same adapter.

## LUN

Logical unit number, a subdivision of a SCSI target. It is the small integer handle that differentiates an individual disk drive or partition (volume) within a common SCSI target device such as a disk array.

Technically, a LUN can be a single physical disk drive, multiple physical disk drives, or a portion (volume) of a single physical disk drive. However, LUNs are typically not entire disk drives but rather virtual partitions (volumes) of a RAID set.

Using LUNs, the FC host can address multiple peripheral devices that may share a common controller.

## maintenance button

Multifunction momentary switch on the front panel of the router.

**management workstation**

PC workstation used to manage routers remotely by connecting to the routers using the SANsurfer Router Manager or CLI commands.

**MD5**

Message-digest algorithm 5. MD5 is a widely used, partially insecure cryptographic hash function with a 128-bit hash value. An MD5 hash is typically expressed as a 32 digit hexadecimal number.

**media**

Physical-layer information carriers. FC supports several different physical media: copper, multimode optical, and single-mode optical. All FC protocols are supported on all media.

**MIB**

Management information base. A set of guidelines and definitions for SNMP functions.

**mid-plane**

Located inside the iSR6250 chassis between the blades and their corresponding [PCMs](#), the mid-plane connects the removable power supply and the iSR6250 blades.

**N\_Port**

Node port. Connects by a point-to-point link to either a single N\_Port or a single [F\\_Port](#). N\_Ports handle creation, detection, and flow of message units to and from the connected systems. N\_Ports are end ports in virtual point-to-point links through a fabric, for example N\_Port to F\_Port to F\_Port to N\_Port using a single FC fabric switch. See also [FL\\_Port](#).

**NIC**

Network interface card. Computer card installed to enable a dedicated network connection.

**NL\_Port**

Node loop port. A port capable of arbitrated loop functions and protocols. An NL\_Port connects through an arbitrated loop to other NL\_Port and at most a single FL\_Port. NL\_Ports handle creation, detection, and flow of message units to and from the connected systems. NL\_Ports are end ports in virtual point-to-point links through a fabric, for example NL\_Port to F\_Port to F\_Port to N\_Port using a single FC fabric switch. In the absence of a fabric switch FL\_Port, NL\_Ports can communicate with other NL\_Ports in virtual point-to-point links through an FC\_AL open loop circuit often through FC\_AL (Arbitrated Loop) hub or loop switch devices. See: [E\\_Port](#), [F\\_Port](#), [FL\\_Port](#), [G\\_Port](#), [N\\_Port](#).

**NTP**

Network time protocol. NTP is used for distributing the Coordinated Universal Time (UTC) by means of synchronizing the clocks of computer systems over packet-switched, variable-latency data networks.

**NVRAM**

Non-volatile random access memory. NVRAM is a type of memory that retains data (including configuration settings) even when power is removed. You can configure NVRAM settings manually or restore them from a file.

## path

A path to a device is a combination of an adapter [port instance](#) and a target port as distinct from internal paths in the fabric network. A fabric network appears to the operating system as an opaque network between the adapter (initiator) and the target.

Because a path is a combination of an adapter and a target port, it is distinct from another path if it is accessed through a different adapter and/or it is accessing a different target port. Consequently, when switching from one path to another, the driver might be selecting a different adapter (initiator), a different target port, or both.

This is important to the driver when selecting the proper method of failover notification. It can make a difference to the target device, which might have to take different actions when receiving retries of the request from another initiator or on a different port.

## PCM

Power and cooling module. A device that consists of one power supply and three fans.

## point-to-point

Also FC-P2P. Two FC nodes directly connected (not in a loop).

## port

Access points in a device where a link attaches. There are four types of ports, as follows:

- [N\\_Port](#)—an FC port that supports point-to-point topology.
- [NL\\_Port](#)—an FC port that supports loop topology.
- [FL\\_Port](#)—a port in a fabric where an [N\\_Port](#) can attach.

- [FL\\_Port](#)—a port in a fabric where an [NL\\_Port](#) can attach.

## port instance

The number of the port in the system. Each adapter may have one or multiple ports, identified with regard to the adapter as port 0, port 1 and so forth. To avoid confusion when dealing with a system containing numerous ports, each port is assigned a port instance number when the system boots up. So Port 0 on an adapter might have a port instance number of 8, for example, if it is the eighth port discovered by the system.

## POST

Power-on self test. Diagnostics that the router performs at start-up.

## RISC

Reduced instruction set computer. A computer microprocessor that performs fewer types of computer instructions, thereby operating at higher speeds.

## RSCN

Registered state change notification. RSCN is an FC fabric notification sent to all specified nodes when any major fabric changes occur. This notification allows nodes to immediately gain knowledge about the fabric and react accordingly.

## router log

Log of messages describing events that occur on the intelligent storage router.

## SAN

Storage area network. Multiple storage units (disk drives) and servers connected by networking topology.

**SANsurfer Router Manager**

Workstation-based router management application that provides a graphical user interface (GUI) used to configure and monitor intelligent storage routers.

**SCSI**

Small computer system interface. A high-speed interface used to connect devices, such as hard drives, CD drives, printers, and scanners, to a computer. The SCSI can connect many devices using a single controller. Each device is accessed by an individual identification number on the SCSI controller bus.

**SFP**

Small form-factor pluggable. A transceiver device, smaller than a GigaBit Interface Converter, that plugs into the Fibre Channel port.

**SNMP**

Simple network management protocol. SNMP is a networking protocol that enables you to monitor the router using third-party applications that use SNMP.

**SSH**

Secure SHell. Communications tool that provides secure and encrypted connections to traditionally non-encrypted services.

**storage area network**

See [SAN](#).

**target**

The storage-device endpoint of a SCSI session. Initiators request data from targets. Targets are typically disk-drives, tape-drives, or other media devices. Typically a SCSI peripheral device is the target but an adapter may, in some cases, be a target. A target can contain many LUNs.

A target is a device that responds to a requested by an initiator (the host system). Peripherals are targets, but for some commands (for example, a SCSI COPY command), the peripheral may act as an initiator.

**VLAN**

Virtual logical area network (LAN). A group of hosts with a common set of requirements that communicate as if they were attached to the same wire, regardless of their physical location. Although a VLAN has the same attributes as a physical LAN, it allows for end stations to be grouped together even if they are not located on the same LAN segment. VLANs enable network reconfiguration through software, instead of physically relocating devices.

**VPG**

Virtual port group. VPG is the iSR6250 software component used to create additional logical FC adapter initiator ports on the fabric.

**world wide node name (WWNN)**

Unique 64-bit address assigned to a device.

**world wide port name (WWPN)**

Unique 64-bit address assigned to each port on a device. One WWNN may contain multiple WWPN addresses.

---

### **world wide unique LUN name (WWULN)**

WWULN identifiers for SCSI devices are read from page 83 and page 80 of your SCSI block device as based on the SCSI standard. SANsurfer looks for identifiers in the order of: page 83 type 3, page 83 type 2, page 83 type 1, page 80, and lastly page 83 type 0.

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